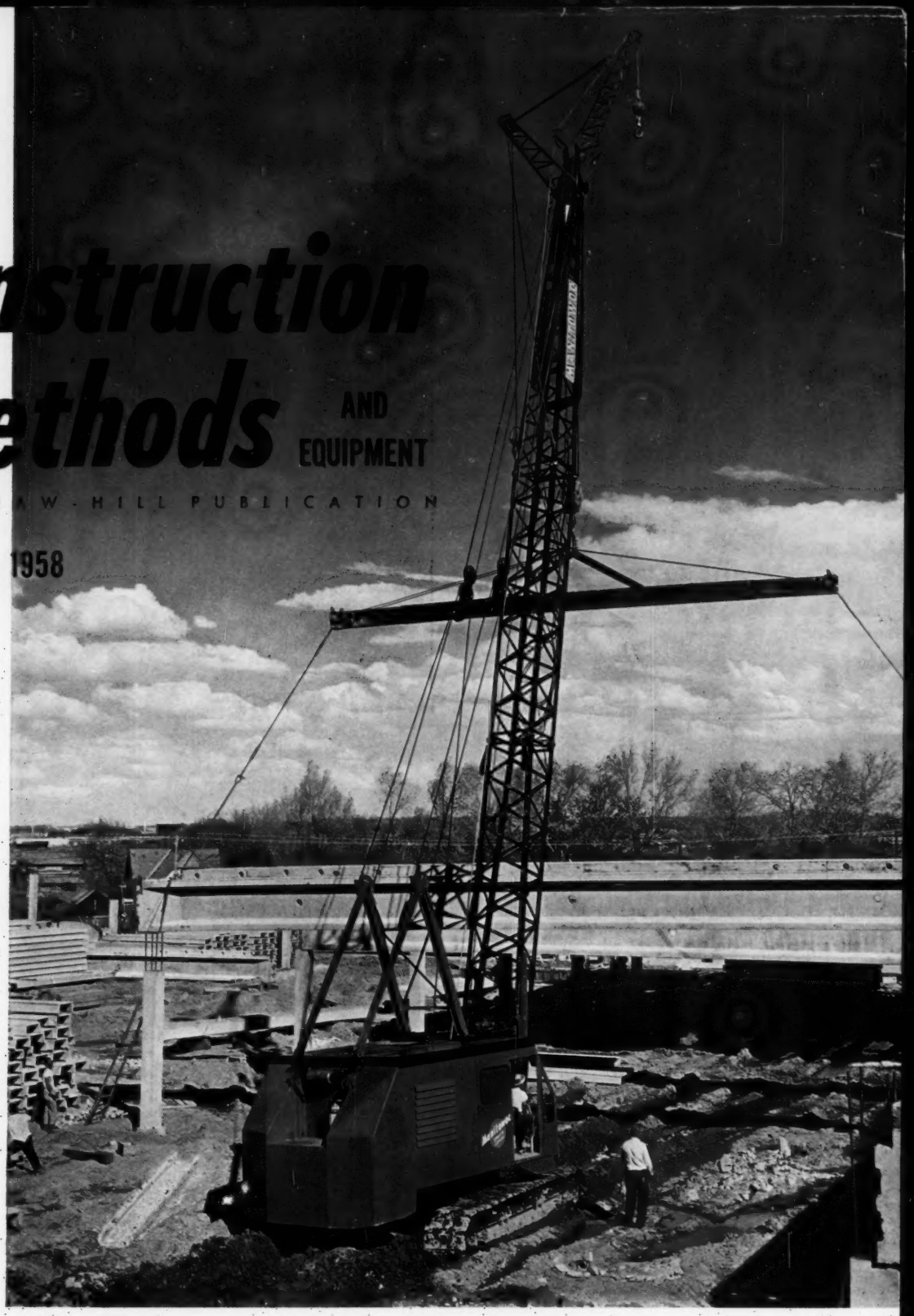
PRICE $1.00

Construction Methods AND EQUIPMENT

A McGRAW-HILL PUBLICATION

NOVEMBER, 1958



In Colorado, a powerful 60-ton crawler crane sets a prestressed concrete girder in place for a drug company warehouse. Erecting the 44-ft units is a precision job, for cored holes at the girder ends must slip over dowels projecting from the columns.

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Open 'er up!

"POWERSTEEL"®
is more than the match for today's most powerful machines!

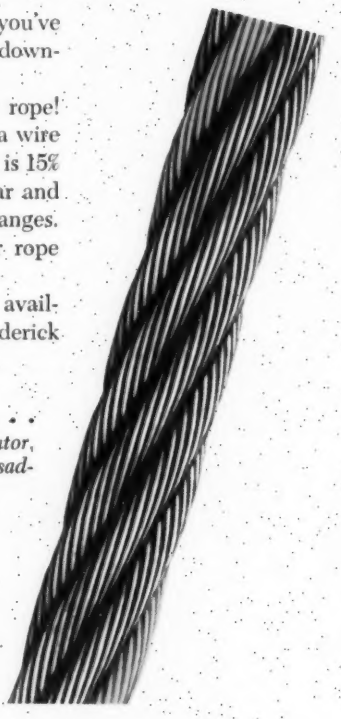
With today's bigger and more powerful construction equipment, you've got to keep it working at full capacity – no babying – minimum down-time – to show a profit.

So don't shortchange today's power with yesterday's wire rope! With "POWERSTEEL" you'll get trouble-free production from a wire rope designed for today's greater horsepower and bigger loads. It is 15% stronger than improved plow steel rope – more resistant to wear and abrasion – gives longer service life – requires fewer rope changes. Many "POWERSTEEL" users report as much as 100% longer rope service in comparison to ropes formerly used!

Yellow Strand "POWERSTEEL" is always nearby – always available – at your Broderick & Bascom Distributor. See him soon! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

NEW! YELLOW STRAND WIRE ROPE CLIPS . . .
Ask for them at your Yellow Strand Wire Rope Distributor. Heavy-duty galvanized steel U-bolt. Drop-forged steel saddle, hot dip galvanized. Easily applied.

Yellow Strand® Wire Rope



B.F.Goodrich

Men punch holes in rock to blow up a cliff

B.F.Goodrich improvements in rubber brought extra savings

Problem: Those workmen are drilling holes for dynamite charges, to blast out rock for a dam. It's no cinch to lug a heavy drill down a cliff like that. Too many times it had to be promptly carried up again—the tool had choked to death.

When heat from the compressor got into the hose, it would harden the rubber, breaking it into loose, gummy particles that clogged the air tool, put it out of action.

What was done: B.F.Goodrich engineers went to work on the problem. By adding, subtracting, changing proportions of rubber, they found a special compound that stands hot air, won't harden, crack, or break into gummy particles to clog tools.

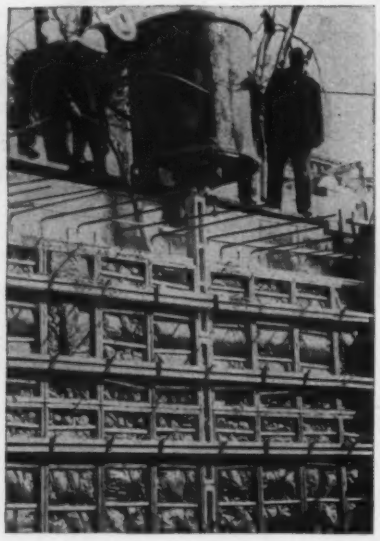
Savings: Hose lined with this new rubber was made and put to work. On jobs where air hose used to go to pieces in weeks, B.F.Goodrich hose lasts months, even years. The nuisance of clogged tools was ended permanently.

Extra benefits: Resistance to heat is only one of the improvements made in this B.F.Goodrich air hose. It has a cover so rugged that dragging over rough rock won't tear it. And it's light, flexible, easy to work with.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich air hose described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-471, Akron 18, Ohio.*

B.F.Goodrich *air hose*

Insulated Forms

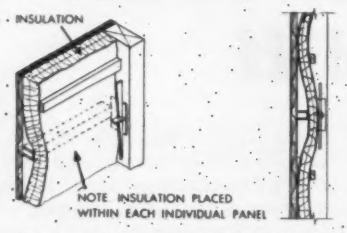


Symons Forms and Balsam Wool Insulation

Save 50% on Cost of Heating & Curing Concrete

C. R. Meyer & Sons Company, Oshkosh, Wisconsin posted this record 50% savings on the new $1,000,000 central office building of the Wisconsin Telephone Company at Oshkosh. Two-inch insulation in 24-inch widths was tacked to the forms. Walls were 12 inches thick and varied in height from 12 to 16 feet.

Pouring was started in January. Temperatures ranged from five to 25 degrees above zero. Concrete at time of pour was held in the 70 to 80-degree range. During one pour a



Cutaway section of form with insulation

tube was cast in the wall four feet from the top with a thermometer suspended in the bottom. After 24 hours, temperature at center of concrete rose to 105 degrees and after five days the concrete went back to 70.

Symons forms, shores and column clamps may be rented with purchase option. FREE literature on Symons' products is available upon request.

Symons

SYMONS CLAMP & MFG. CO.

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Chicago 39, Illinois

Construction Methods AND EQUIPMENT

NOVEMBER, 1958

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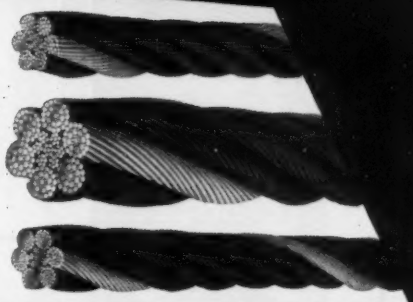
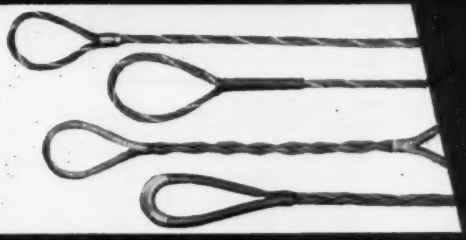


SLINGS

Hundreds of sizes and types of Macwhyte wire rope slings are designed with the lightness, flexibility, and handling ease you need for efficient, low-cost material handling. Three body styles are made: ATLAS Round-Braided, DREW Flat-Braided, MONARCH Single-Part. Ask for your free copy of Sling Data Bulletin 5308-R.



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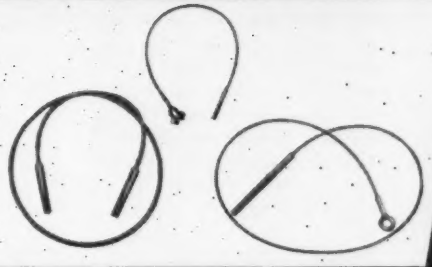
Safe-Lock wire rope assemblies are made in a wide range of sizes for machine parts, controls, and operating devices. They are prefabricated to the exact size and length you need—ready-to-use for safe, easy, quick, low-cost installation. Ask for Bulletin 57126.



When you buy Macwhyte products in any form —

Wire Rope, Slings, or Cable Assemblies — you're buying a piece of our organization. Our wire rope engineers are as near as your phone, ready to advise and make recommendations — for free! — on *all* your wire rope needs. If your problem is unique, our engineers will specify a rope or assembly to meet your particular requirements safely, economically, and correctly. Don't guess about wire rope. Call on Macwhyte . . . you'll be glad you did!

Have you seen our film on wire rope, "Life-Line"? It's available on a loan basis to groups. Ask for Bulletin.

MACWHYTE Wire Rope COMPANY

MACWHYTE WIRE ROPE COMPANY, 2941 Fourteenth Ave., Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel, Plastic Coated and Nylon Coated Wire Rope, and Wire Rope Assemblies. Special catalogs available.

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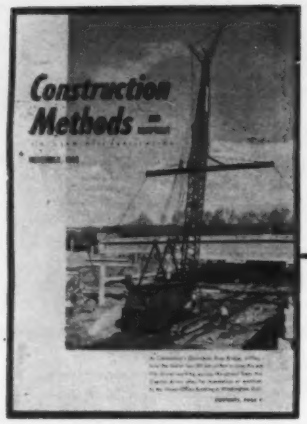

ON THE COVER

Shurtleff & Andrews Inc., Salt Lake City contractors, moved over the mountains to build a 120,000-sq-ft warehouse in Denver. There, from a job-site casting and post-tensioning yard, their Manitowoc 3900 walks concrete girders to the structure and sets them atop cast-in-place columns. The girders are 16 in. wide, 48 in. deep, and weigh 32 tons each. They are cast in forms designed by the Otto B. Buehner Pre-Cast Co., Murray, Utah.

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NEXT MONTH

Drilled-in-caissons and a novel method of concreting them in water with a colloidal grout and outsized aggregate play key roles in building a tricky foundation alongside the Hudson River in New York City. The foundation is for a conveyor bridge 165 ft long that will feed coal to a powerhouse across the street.

NOVEMBER, 1958

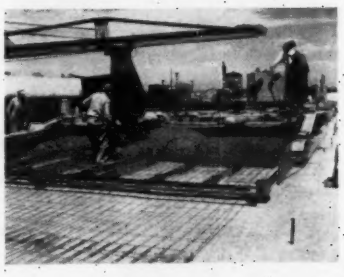
Pay Dirt in This Issue

Jacks on Barge Erect Arch Bridge 78

Contractor places two halves of a 340-ft steel arch on barge, tows the pre-assembled sections to site, and lifts them into place by jacking from specially designed towers.

Slip-Form Paver Places Reinforced Concrete 82

A sled that moves in front of the paver feeds in wire mesh reinforcing at the proper height so the slip-form machine can put down an 8-in. reinforced concrete slab in one pass.



Conveyor Moves Fill Down a Mountain 84

A 2-mi conveyor zig zags down a California mountainside to deliver 9,400,000 yd of impervious fill for the core of $46-million Trinity Dam, highest earthfill dam in the world.

Safety in the Trench 81

LPG Cuts Fuel Costs for Asphalt Plant 95

Bailey Bridging: A Special Report 102

New Subgrader Paces Record Paving Spread 123

Jacks Erect Steel Tower 126

Crews Switch Bridge Spans in Midstream 131

YOU BE THE JUDGE

Put a Gorman-Rupp Diaphragm Pump on your job . . . alongside any other make, size for size. If it doesn't prove to be the best all around pump, return the Gorman-Rupp.

Gorman-Rupp 3" diaphragm pump with Briggs & Stratton 8BR6 engine.

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Check the Yellow Pages or the Factory. There is a dealer near you.

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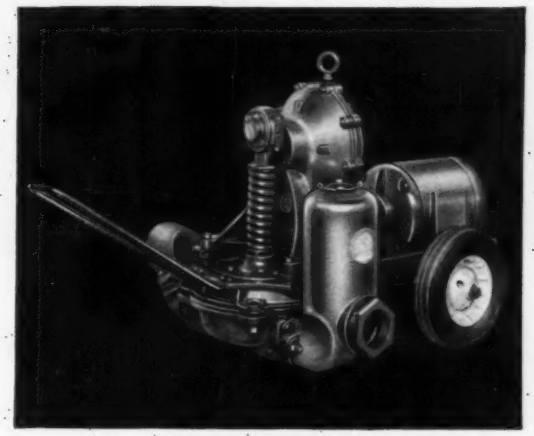
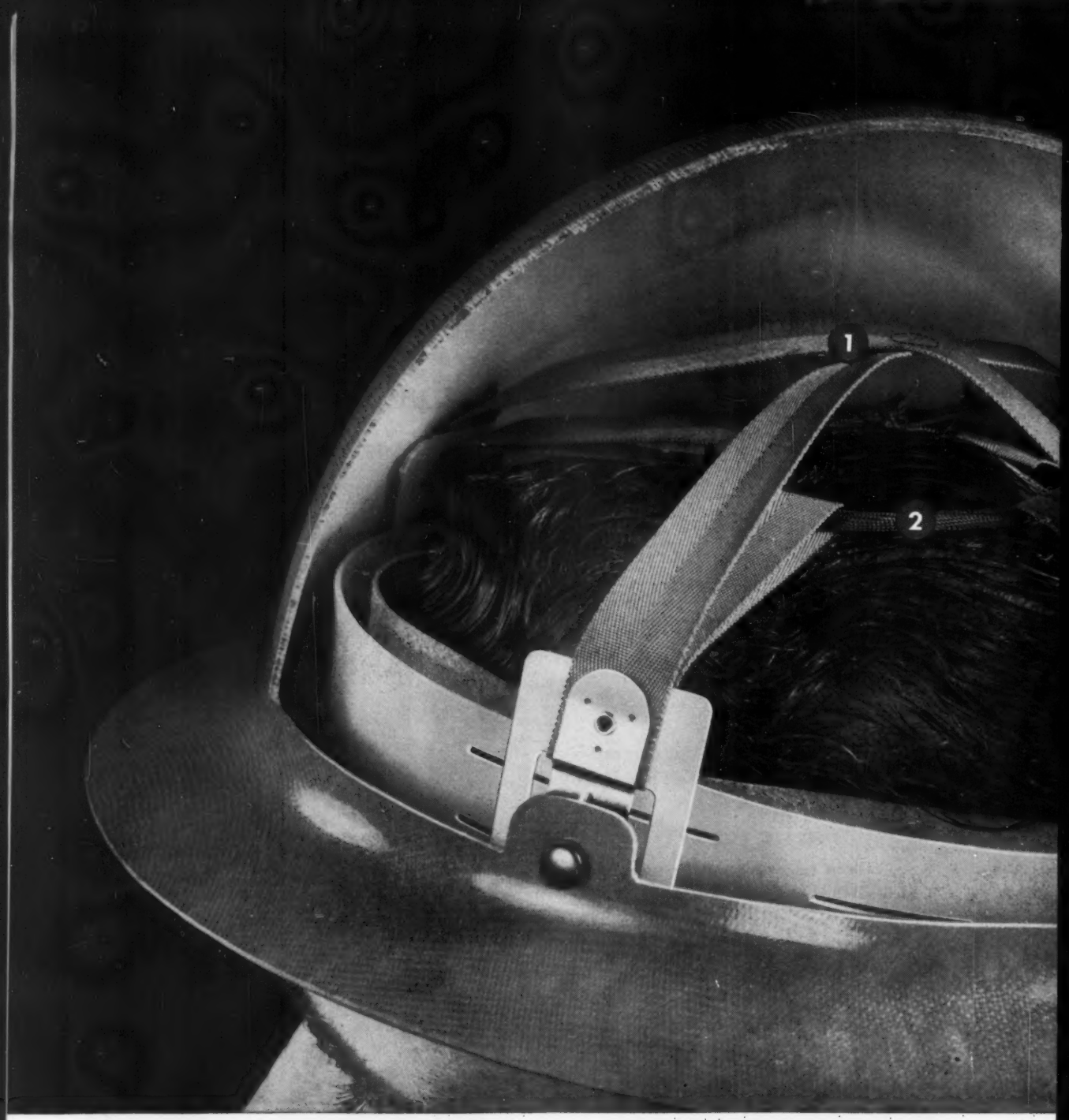


Gorman-Rupp 4" diaphragm pump with electric motor.

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

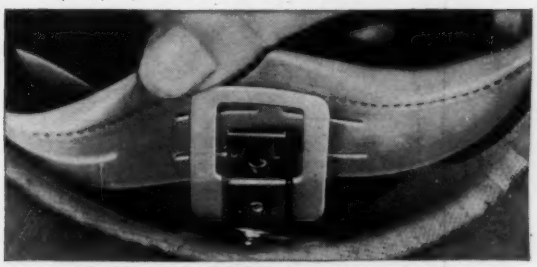


New M-S-A® Suspension gives you double cradle for

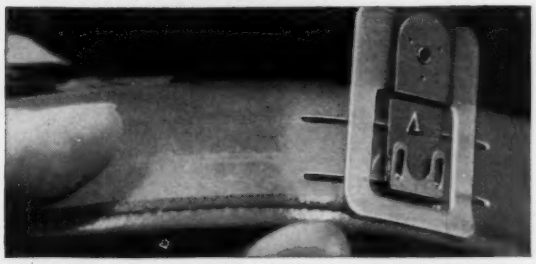
The new M-S-A "Fixed-Crown" Suspension for Skullgard hats and caps—with its unique double cradle design—is the answer to industry's need for the ultimate in head protection *and* comfort.

This suspension more than meets the Federal specifications of at least a 1¼" crown clearance between the wearer's head and the inside top of the shell. This crown clearance—so important when a heavy object falls on the hat—is made tamper-proof by a permanently fixed upper cradle providing a built-in margin of safety.

And how do you adjust for comfort? That's up to the wearer. The lower cradle, the one for comfort, is adjustable to the wearer's own



EASILY INSERTED AND REMOVED. Four wide snaps have positive spring steel lock-in catch. Permits easy removal and insertion, but prevents accidental detachment in the field.



ELIMINATES PRESSURE POINTS. Metal snaps are recessed into plastic frames. This exclusive design feature reduces layer thickness at points of contact.

AIR CUSHION SWEATBAND. The sweatband is designed with a rolled edge which provides an air cushion effect for greater comfort. Tab at end of sweatband keeps it smooth and free of bulges.

FAST SIZE ADJUSTMENT. Size adjustments can be made in seconds with a simple collar button device. Head sizes are stamped on the sweatband backing which can be adjusted in one-eighth units.

❶ "Fixed-Crown" Clearance and ❷ Adjustable Comfort

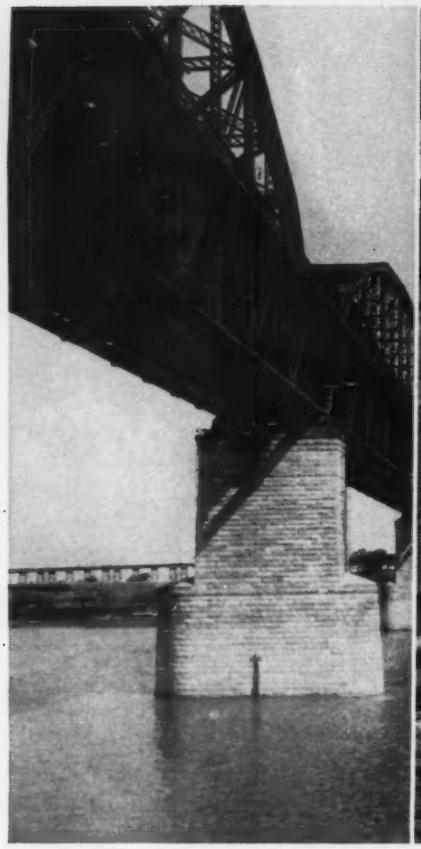
personal requirements. But this comfort adjustment won't affect that extra margin of protection in the upper cradle.

This new M-S-A "Fixed-Crown" Suspension is adaptable for MSA's Type K and Type B Skullgards, and the M-S-A Glass Fiber Hat. There's no cleaning problem, either. The suspension cradle is made of long-lasting, easily sanitized, plastic webbing. It's mildew-proof. Oil-proof. Acid-proof.

Check the other features of the new suspension illustrated above. And get in touch with the MSA man for answers to specific questions. Write for descriptive bulletin today.

MSA
SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES COMPANY
Pittsburgh 8, Pennsylvania



LACLEDE DESIGNED REINFORCEMENT SPEEDS REPLACEMENT OF CONCRETE BRIDGE DECK

A ticklish problem arose in the renovation of MacArthur Bridge, spanning the Mississippi River at St. Louis. Three existing pavement lanes were to be replaced with concrete slabs, reinforced with Laclede Multi-Rib Round Reinforcing Bars. To permit uninterrupted traffic flow over the bridge, the project was to be accomplished a lane at a time.

the problem:

Vibration from traffic on a completed lane would be transmitted through the tie-bars, disrupting bond of the reinforcement to newly-poured concrete in the adjoining lane.

the solution:

Laclede engineers, cooperating with the Bridge Department of the City of St. Louis and C. E. Smith & Company, consulting engineers, designed special tie-bars with three-inch-wide bands of asphaltic material wrapped around the point where they passed through the center joint. Vibration from heavy vehicular traffic was cushioned and absorbed by these flexible wrappings. Bond of reinforcement to new concrete in the lane under construction remained unaffected during the entire setting and curing period.

General Contractor: Fruin-Colnon Contracting Co., St. Louis.

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LACLEDE STEEL COMPANY

SAINT LOUIS, MISSOURI ◆ Producers of Steel for Industry and Construction

NORTHWEST PULLSHOVELS make it EASIER!

NO ONE ever lost money by buying the best in equipment! When you buy a Northwest Pullshovel you are ready for the toughest job a Pullshovel will ever be called on to handle. Whether it's a rock job like the one at the left or an easy dirt trench like the one at the right, you never have to baby your Northwest. It gets the rock out and it makes easy digging easier for greater output.

There's a wide range of capacities to choose from—from the big 95 down to the ¾ yard Model 25.

Boom design permits deep digging and yet assures long reach. Dippers fill easily and dump cleanly and can be raised high to clear the truck without spilling the load. A wide selection of side teeth lets you meet your digging problem exactly. Heavy duty Crawlers have been proved in miles of travel and travel gears are fully enclosed. Cast steel machinery bases take the shocks of digging. The "Feather-Touch" Clutch Control gives ease of operation without the complication of pumps, compressors or other delicate mechanisms. These and many other Northwest Pullshovel advantages combine to give you high output and fast moving jobs. Let a Northwest man give you the whole story. Ask for a catalog on the size machine you need.

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NORTHWEST *Always Ready to* **GO**

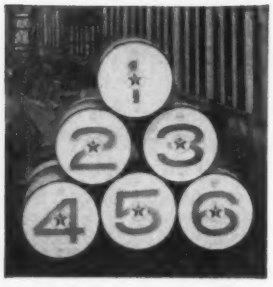
NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

P-25-9-ICG

SECOND LARGEST DAM IN THE U. S., at Glen Canyon, Ariz., will incorporate two of these 2,800 ft. diversion tunnels. Frazier-Davis equipment runs dependably, stays on the job, thanks to the Texaco Simplified Lubrication Plan.

Glen Canyon tunnel borings nearing completion with Texaco Plan



Only 6 lubes needed to keep Frazier-Davis equipment working dependably

This is Frazier-Davis Construction Company's job: to bore the east side diversion and service tunnels, with a combined length of 2½ miles, through the walls of Arizona's Glen Canyon. It's a vital project, part of the Bureau of Reclamation's $760 million development of 10,000 square miles of arid land. On a job as big as the Glen Canyon Dam, on-time completion of every phase is absolutely essential. And that puts a priority on dependable equipment performance.

The Texaco Plan keeps equipment on the job—at lowest cost—by handling all major lubricating problems with no more than six products. A combination of specialized and multi-purpose lubricants assures proper lubrication for each machine, with lower lubricant inventory and less chance for mistakes. For Frazier-Davis, the Texaco Simplified Lubrication Plan has proved to be one of the most economical and dependable ways to get top performance from every piece of equipment.

Here are the lubricants Texaco recommended for Frazier-Davis:

Texaco Ursa Oil Heavy Duty—keeps engines clean, rings free, valves properly seated for full power.

Texaco Regal Oil R&O—prevents formation of rust and harmful deposits in compressor systems.

Texaco Universal Gear Lubricant EP—keeps differentials and transmissions running smoothly at low cost.

Bureau of Reclamation photos

Texaco Marfak Multi-Purpose 2—protects wheel bearings, chassis, water pumps against dust, moisture and wear.

Texaco Track Roll Lubricant—prolongs the life of crawler mechanisms.

Texaco Rock Drill Lubricant—guards against wear and rust whether drills are running or idle.

Ask a Texaco Lubrication Engineer to help you simplify your lubrication problems and reduce costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Towed on its own pneumatic tires.
Completely new Model 873 Finisher has proved its superior performance in paving city streets, alleys, parking lots, driveways, playgrounds, highway shoulders, highways and many other jobs.
Barber-Greene
New folding hopper in raised position.
NEW BARBER-GREENE
MODEL 873 FINISHER

paves on crawlers . . . travels on rubber

With crawler traction and flotation for the variety of bases encountered in paving all types of jobs—including parking lots, driveways, playgrounds, etc.—and trailed at truck speed on its own hydraulically retractable pneumatic tires, this new finisher includes advancements never before available.

Unmatched tamping, leveling and thickness control principles of the larger Barber-Greene Model 879-B Finisher.

Paves on crawlers. Paving all kinds of jobs, the 873 has crawler traction and flotation for all base conditions—especially less stable bases.

Travels on rubber. Hydraulically lifts itself on pneumatic tires for trailing with its own towing hitch.

New hydraulically folding hopper. Maximum capacity and truck clearance in open position. Sides hydraulically raise to feed automatically. No dead areas. Reduces transport width to 8'.

New simplified controls. Single steering lever. New hydraulic controls for material flow, screed hoist, towing wheels, and folding hopper.

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Paving speeds to 50 fpm. Towing speeds to 30 mph. Converts from paving to towing in seconds.

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Write for information on this significant advancement in asphalt equipment

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Construction News From Washington

Washington, D.C.
November, 1958

Bid-Shopping Fight Ends

The long fight of specialty contractors for bid-shopping legislation is over. For some years, they have been trying to get through Congress a law that would protect their position under the prime contractor on government contracts.

The driving force has been the National Electrical Contractors Association, who wanted to require a general contractor to submit to the government procurement official the list of principal subcontractors who would work with him on the project.

The House voted such a bill in 1957, but this year's attempt to get Senate approval failed when the plumbing contractors and the plumbing unions came out in opposition.

Now, the electrical contractors have decided not to try again when Congress comes back in January.

New Source of Capital

Construction firms will want to keep an eye on the new capital banks that are being formed around the country. The federally chartered institutions will be (1) a new source of capital, if you need some yourself; (2) a new place to look for business; and (3) a new channel—with tax-saving advantages—for investing and expansion.

The new banks were authorized under legislation passed by Congress to provide equity capital and long-term loans to small businesses that often have found this kind of money unavailable, regardless of how good their prospects are.

Great interest has been shown by business men, manufacturers, and bankers in forming such banks—the main reasons being that there are significant tax advantages for the investor that enable him to reduce his losses if an investment goes sour. An investor in a federally chartered capital bank can deduct any loss on his investment directly from taxable income; a loss on any other type of investment is deductible only from capital gains.

The effect of this tax break—and others in the law—is to make the new capital banks a better opportunity for venture capital than is available elsewhere.

Asphalt vs Concrete

Another round of the long fight between asphalt and concrete will be over sometime this month. The Army Engineers and the Air Force are polishing a report to the House Armed Services Committee on the results of their asphalt test strip which was given 5,000 simulated heavy bomber round-trips—equal to 20 years of actual service.

continued on next page

Asphalt interests were happy about things as the tests were concluded. They say indications are that the asphalt pavement designed for the heaviest traffic on airport runways stood up well. They've got their hopes up that the test results will end the present Air Force ban against asphalt for runways.

Waterworks Construction

Democrats will push next year for a $100-million-a-year federal subsidy for construction of municipal water works. The Republicans have been dead-set against this in the past and will continue to be—but the way the battle is shaping up, it looks like cities are bound to get more than the $50 million authorized by law now.

The White House still wants to discontinue the direct federal aid program—strongly favored by the cities—and turn the whole thing back to the states. And some Republicans say they would be willing to turn over to the states the federal excise tax on telephone calls that produces $85 million a year so states will have new revenue to pay for the program.

Secretary Flemming of the Department of Health, Education, and Welfare says the Administration will stick with the $50-million program if neither the GOP nor the Democrats put across their new ideas.

Spending Fight

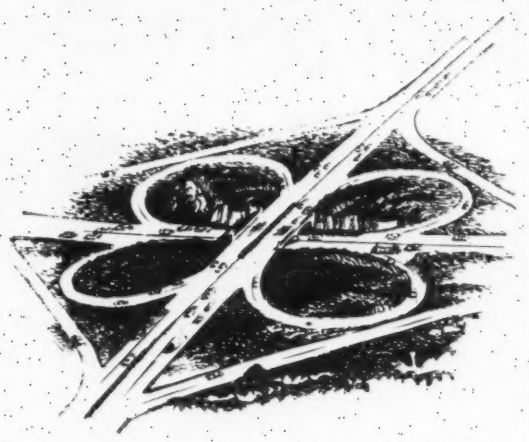
Federal construction programs are holding up well in the spending scrutiny that followed White House instructions to trim expenditures wherever possible. After a long, hard look, the Defense Department decided that its military construction budget was already at rock bottom and could not be cut further. Likewise, for civil works construction, the Budget Bureau has made fund releases that indicate no slow-downs on either new starts or continuing projects of the Army Engineers and the Reclamation Bureau.

Military construction spending is to go ahead at a $2-billion rate this year. That is the latest estimate of Defense Department budget officers. Budget makers had hoped to reduce construction expenditures by some $500 million in fiscal 1959, ending next June 30.

Essential speedy construction for ballistic missiles and aircraft dispersal bases will take a slug of new money, Pentagon officials find. Work must be rushed on bases for the Atlas intercontinental missile and for the Titan, as well as for additional Strategic Air Command B-52 and B-47 bomber bases. Adding these to other high-priority requirements rules out a cut to $1.5 billion.

Civil works construction also has been spared the economy axe. Money allotments to the Corps of Engineers and the Reclamation Bureau for the first two quarters are adequate to carry on the full programs voted by Congress, including preparation of some 60 new starts for initial construction contracts.

Observers look for the economy drive to be held up until the President presents his next budget message in January. New starts proposed for fiscal 1960 will get short shrift in that message, they predict.



400 Richmond products speed road building

RICHMOND SNAP-TYS
3,000 lbs. — 5,000 lbs.
for culverts and
light wall forms

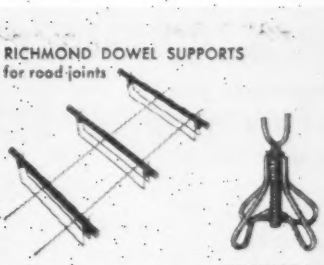
RICHMOND
2-STRUT TYSCRUS
½" to 1"
for heavy wall forms

RICHMOND
4-STRUT TYSCRUS
1" to 1½"
for mass concrete
forms

RICHMOND
SCREW ANCHORS
& BOLTS
¾" to 1½"
for false-work support brackets

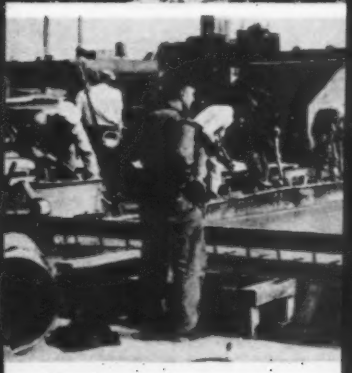
RICHMOND BAR SUPPORTS
for reinforcing steel

RICHMOND
HANGAR FRAME SCREEDS
for hanging and screeding concrete decks



RICHMOND DOWEL SUPPORTS
for road joints

RICHMOND
ADJUSTABLE SCREED CHAIRS
for screeding deck slabs



Shown here are a few of the items in the complete line of Richmond-engineered form-tying, anchorage and accessory devices for concrete construction. The Richmond Handbook describes all of them, gives wire and steel sizes used, safe loads and ultimate strength values. There is a Richmond product for every concreting need.

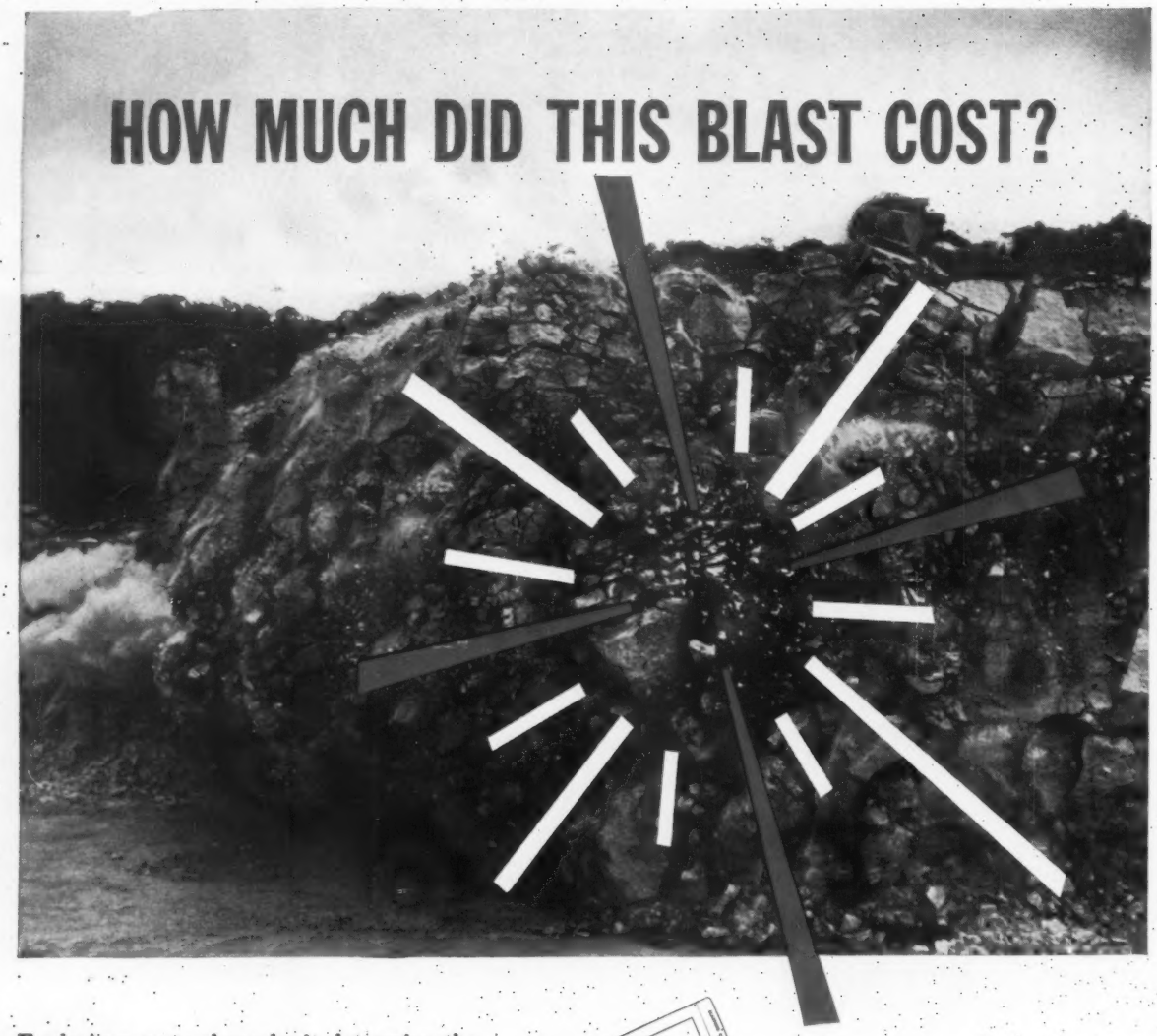
For your copy of the current handbook — or for help on a specific problem — write to: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 S. Fourth Street, St., Joseph, Mo.

INSIST ON RICHMOND
... AND BE SURE IT'S RICHMOND!

Richmond
SCREW ANCHOR CO., INC.

816-838 LIBERTY AVENUE · BROOKLYN 8, N.Y.
315 SOUTH FOURTH ST. · ST. JOSEPH, MO.

HOW MUCH DID THIS BLAST COST?



Explosives costs alone don't determine the value of a given blast. The explosives you use have a direct effect on the whole operation: drilling, digging, hauling and crushing.

You can find out, quickly and easily, the true, complete cost on any blast by using the new, simplified computing method developed by Atlas. It's called the Blasting Cost Chart, and it's yours without cost or obligation.

Use this new method to learn your real blasting costs. It will help you plug profit leaks and come out money ahead in your blasting. Your nearest Atlas representative will show you how the chart works, and you can keep the actual figures within your own organization.

EXPLOSIVES
DIVISION
ATLAS
POWDER COMPANY
WILMINGTON 99, DELAWARE
offices in principal cities

Exceptional performance of 7 other International engines in the Blow & Cote fleet caused the contractors to repower this Bucyrus-Erie 30-B shovel with an International 6-cylinder diesel.

How contractor minimizes maintenance with 8 International-powered machines

Blow & Cote, Inc., road builders from Morrisville, Vt., have a sure-fire solution for getting extra engine life with minimum maintenance from crawlers, shovels, and compressors—International power.

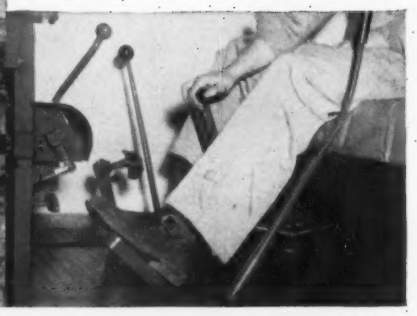
Partner Dennis Cote tells why they operate with four International crawlers plus four International diesels in shovels and an air compressor: "We standardized on International engines because of long, trouble-free life, minimum repairs, and unmatched work-ability. Our oldest UD-14 engine ran 8500 hours before being overhauled. Another UD-18 engine has worked 5500 hours with only one valve grinding job. All eight have plenty of power and good lugging ability."

Investigate the profit-protection you can get by specifying International power in your new machines or at repower time. Get full details on any of the eight outstanding International diesels from your nearby International Power Unit Distributor or Dealer... who also provides the finest parts and service support available anywhere on heavy-duty power.

International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

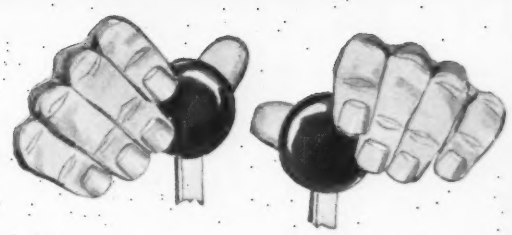


FEATHER-TOUCH CONTACT

As the TD-24 pusher approaches the Payscraper, operator slows tractor speed *with one hand* by power-shifting planetary system; and by depressing the foot decelerator. He gets feather-touch contact without declutching, brake-riding, or throttle change!

HIGHER REVERSE

Operator uses decelerator pedal to slow engine at end of pusher run, permitting faster reverse shifting. Fast reverse speeds, coupled with power-shifted planetary steering system, allows TD-24 operators to reposition pusher extra fast and reduce scraper pick-up time.

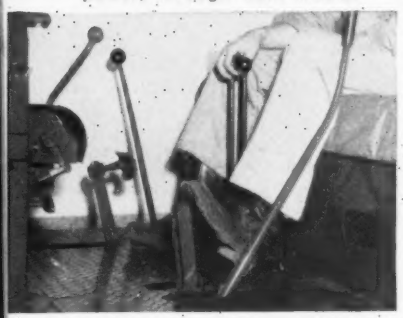


Your operators have fingertip control of greater push-loading profits because...

PLANET-POWERED "24's" beat other rigs on all four steps of the push cycle!

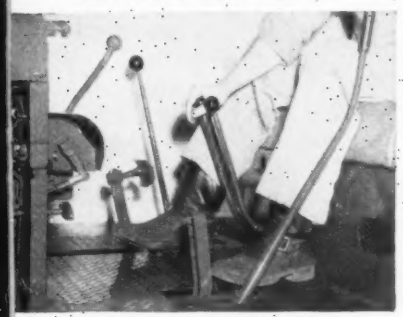
"CONSTANT CONTACT" LOADING

Releasing foot decelerator instantly applies full power, for efficient loading. Power-shifting either track into high range maintains solid pusher contact on curves—applies TD-24's full power, through both tracks!



GEAR HIGHER KICK-OUTS

Once scraper is fully loaded, the TD-24 *follows through* as operator power-shifts on-the-go with one hand to higher gear range, boosting speed of both units 27%. This allows most scrapers to come out of the cut a gear higher.



Your push-loading profits are in your operator's hands. And your operators know they can load out more scrapers every shift when their hands control the boss of the borrow pit—the International TD-24 crawler. The four-step pusher cycle (shown) pinpoints reasons why your operators and TD-24 pushers can increase production with easier control—from contact through kick-out.

Only the TD-24 gives you this big difference in pushers: more productive effort at the fingertip command of your operators! Exclusive Planet Power steering lets your operator: 1) keep pusher speed matched to that of the scraper; 2) power shift either or both tracks up or down a full speed range with a mere flick of the finger; and 3) apply full power to both tracks even if scraper cut is made on a curve.

And your TD-24 operators can fully utilize the decelerator pedal to cut maintenance costs three ways. The decelerator reduces engine clutching; eliminates brake pedal riding for steering; and permits feather-touch scraper contact without slam-bang jarring of operators and machines.

Get all of these TD-24 features that cut the cost of loading out paydirt, with either a Torque Converter or gear-drive tractor best suited to your needs.

If you're a dirtmover, get the TD-24 stay-on-the-job story by checking with any of the thousands of owners. Ask about the comparative life of such important components as track rollers and rails, engine, transmission, and planetary steering system. Get a TD-24 on your job today by calling your International Construction Equipment Distributor for a demonstration. Then you'll see how the TD-24 earned the right to be called "Boss of the Borrow Pit."

International® Construction Equipment

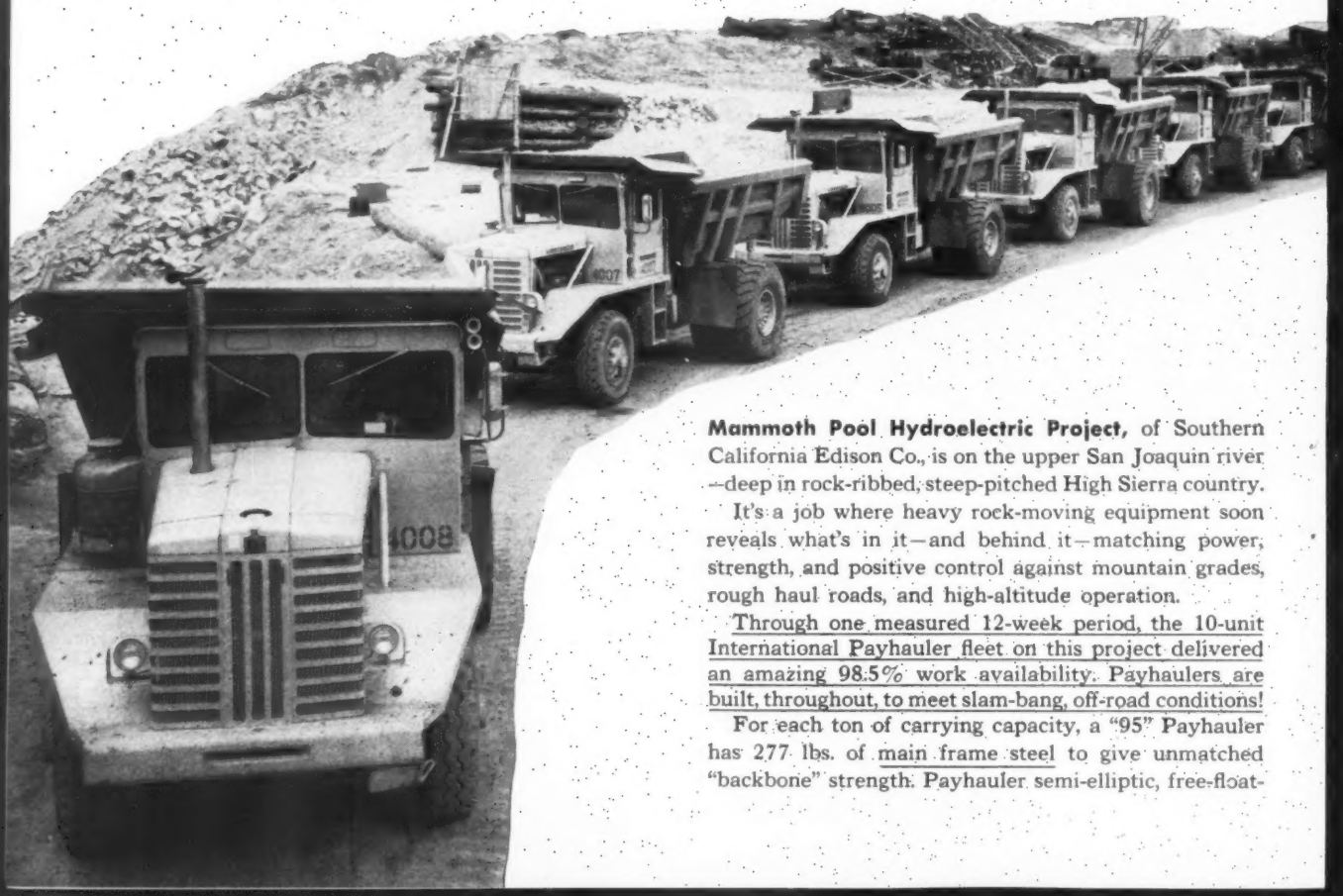
International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

"95" Payhauler® fleet delivers 98.5% availability

highballing rock loads over High Sierra grades

FOR SOUTHERN CALIFORNIA EDISON CO., LOS ANGELES

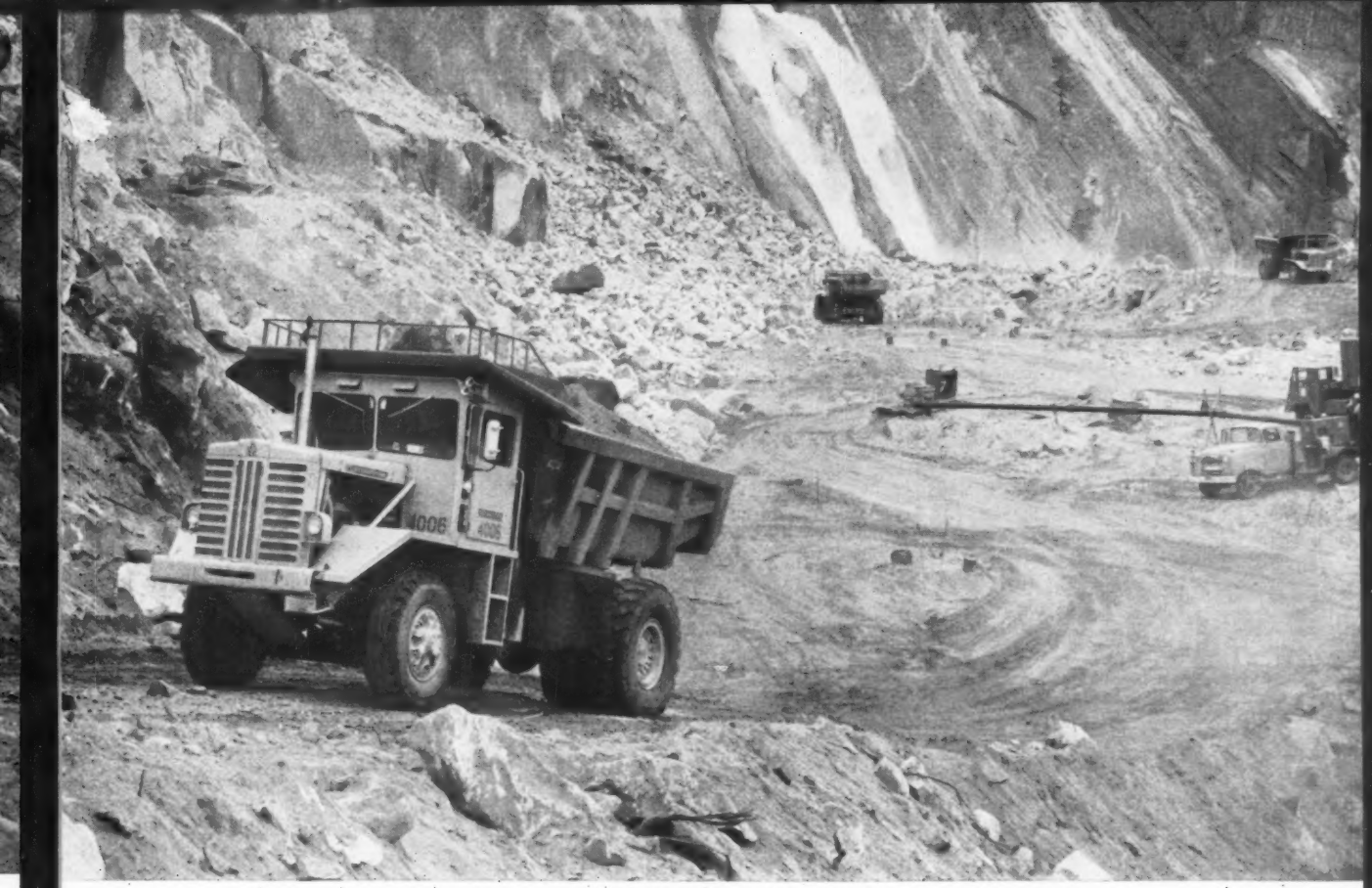


Mammoth Pool Hydroelectric Project, of Southern California Edison Co., is on the upper San Joaquin river—deep in rock-ribbed, steep-pitched High Sierra country.

It's a job where heavy rock-moving equipment soon reveals what's in it—and behind it—matching power, strength, and positive control against mountain grades, rough haul roads, and high-altitude operation.

Through one measured 12-week period, the 10-unit International Payhauler fleet on this project delivered an amazing 98.5% work availability. Payhaulers are built, throughout, to meet slam-bang, off-road conditions!

For each ton of carrying capacity, a "95" Payhauler has 277 lbs. of main frame steel to give unmatched "backbone" strength. Payhauler semi-elliptic, free-float-



"95" Payhaulers are "horsing" their 24-ton rock loads up grades as steep as 18%—on the Mammoth Pool Project! The "95's" Turbo-charged diesel engine develops 335 hp—the 18-ton "65's" is 250 hp!

Here's part of the 10-unit "95" Payhauler fleet parked during noon-hour, that established the amazing 98.5% availability record on Southern California Edison's Mammoth Pool Project!

ing springs gain extra shock-swallowing support from extra leaves and extra length. Payhauler speeds match every load and road. And Payhauler exclusive integrally-forged full-floating planetary drive axles take full-torque loads without over-stress.

This extra built-in stamina helps International Payhaulers establish standout availability records. And so does ready availability of parts and service from your International Construction Equipment Distributor's well-stocked bin and well-manned shop—backed by factory warehouse parts reserves.

See how a Payhauler's bonus of Turbo-Charged diesel power assures you fuel-thrifty, big-load performance—even at high altitudes. Watch how power on Payhauler rear wheels helps deliver top operating efficiency on steep grades or mucky conditions—even where trailer-type units "spin their wheels." Prove that Torqmatic braking safely and positively controls the fully-loaded "95" downgrade—with little or no foot-brake help! See your International Construction Equipment Distributor for a demonstration!

Two rock-loaded "95's" are on their way—while a third one spots its big-target body for the shovel. Five International Planet-Power steered TD-24's and 12 UD-6 International power units on generators also help make this $50 million job roll!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

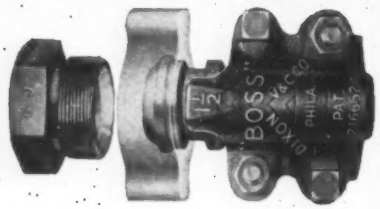
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Safest Connections for Pile Driver Hose

AND OTHER STEAM, AIR, WATER AND HYDRAULIC APPLICATIONS

"GJ-BOSS"

GROUND-JOINT FEMALE COUPLING STYLE X-34



The original *washerless* coupling that is unequalled for *safety* in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal...no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes ¼" to 6", inclusive.

COMPANION MALE COUPLING

"BOSS", STYLE MX-16

Companion coupling for "GJ-Boss", described above, and "Boss" Washer Type Couplings Style W-16. Will prove equally efficient and economical for all applications where standard iron pipe nipples are normally used. Each size fits same size hose . . . oversize hose not required. Coupling consists of I.P.T. male stem and "Boss" Offset and Interlocking Clamp. Steel or malleable iron; thoroughly rustproofed. Sizes ¼" to 6", inclusive.

Stocked by Manufacturers and Distributors of Mechanical Rubber Goods

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GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
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Job Talk . . .

Drums Carry Truck in Swamp

White Contracting Co., of Beaumont, Texas, put together an unusual vehicle to get around in the swampy lowlands of the Gulf Coast. The swamp buggy is a truck with its rubber tires replaced by cylindrical metal drums. Width of the drums increases bearing area enough to keep the truck from getting mired in soggy material.

White made the wheels by bending a flat strip of steel plate into a cylinder 4-ft in diameter. A cone-shaped insert welded to the outside edge of the cylinder connects the drum to the rim of the original wheels. A flat plate closes off the back of the cylinder and reinforces the drum.

At the rear end, a new axle is powered by a chain drive that reduces velocity of the rear wheels. Wood cleats attached to the driving wheels in the back provide greater traction in mud.

Tractor Shovel Handles Pipe

Concrete Pipe Corp., Dedham, Mass., added forks to the operating arms of a Trojan tractor shovel to convert the machine for use in handling sections of reinforced concrete pipe. The rig lifts pipe sections off stockpiles and carries them to trailer trucks.

The tilting action of the Trojan's operating arms enables the operator to stand the pipe sec-

continued on page 28

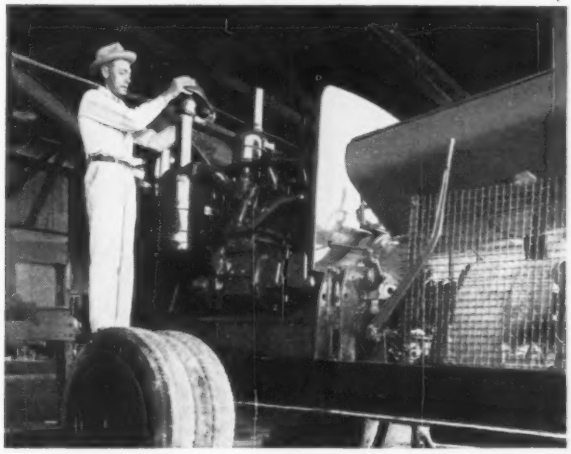
ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

FIRM M. M. SUNDT CONSTRUCTION CO. Tucson, Arizona

RPM DELO OIL ends 5 years of engine troubles

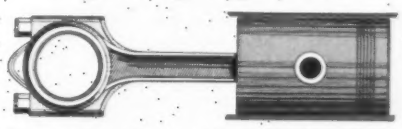
The pan has never been off the Caterpillar D7 engine of this Link-Belt Speeder shovel in 7 years, using RPM DELO Oil. Only repair was a single valve job—no other parts replaced. William Naumann, Sundt's Operations Manager, says, "We tried nine different major brands of oil in five years, trying to lick the frequent breakdowns that slowed our operations. Sometimes, main and rod bearings even froze solid on the crankshaft. We changed to RPM DELO Oil seven years ago, and, since then, have never had any engine troubles due to oil failure. We now use RPM DELO Oil exclusively in our 22 heavy-duty engines."



Lubricated with RPM DELO Oil, this Caterpillar D 13000 portable unit powered a rock crusher of M. M. Sundt Construction Co. for a total of 8976 hours before overhaul. "In spite of extremely dusty conditions the only time the engine was touched was to replace a head—no other repairs were necessary," reports master mechanic Billy Gray, shown replacing air cleaner on unit following overhaul.

Austin 101 rock crusher, powered by Caterpillar unit described above, works 20 hours a day at firm's materials stockpile outside Tucson. Company works year around on road paving, grading, foundations, building construction.

Why RPM DELO Oils reduce wear —prolong engine life



● Oil stays on engine parts—hot or cold, running or idle ● Anti-oxidant resists lacquer formation ● Detergent keeps parts clean ● Special compounds prevent corrosion of bearings ● Inhibitor resists crankcase foaming

LUBRICATING OILS RPM DELO

TRADEMARK "RPM DELO" AND DESIGN REG. U.S. PAT. OFF.

For More Information about this or other petroleum products or the name of your nearest distributor, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey
STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

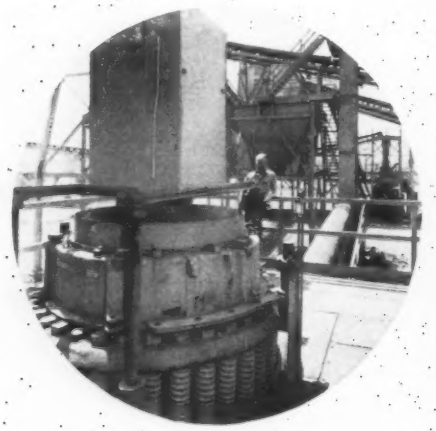
Make more profit on the jobs ahead...

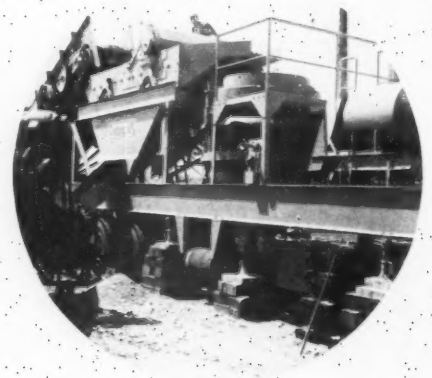
with SYMONS® CONE CRUSHERS for volume production of quality aggregate

Here is a dramatic example of the vast contributions to the progress of mankind being made by the construction industry. In modern engineering and huge construction projects such as this, specification aggregate has assumed an increasingly important role. To meet the constantly growing demand for vast tonnages of quality aggregate used in concrete and bituminous highways, Symons Cone Crushers are today, more so than ever before, the first choice of leading producers throughout the world. Symons Cone Crushers are also used in sand preparation operations.

For in aggregate and sand production . . . *as in all of the great ore and industrial minerals operations the world over* . . . no record equals the performance of Symons Cone Crushers that have so consistently produced, economically and efficiently, great quantities of finely crushed product resulting in higher profit per ton per hour.

Before you submit *your* next bid, get full information about Symons Crushers.





©1958, N. M. Co.

FOR STATIONARY PLANTS

Symons Cone Crushers are the choice of leading contractors and producers for primary, secondary and finer reductions in all types of aggregate operations. Available in both Standard and Short Head types, Symons Cones are built in sizes from 22" to 7' in diameter, for capacities from 6 to 900 or more tons per hour.

FOR PORTABLE PLANTS

Symons Cone Crushers are being used in increasing numbers for portable and semi-portable crushing plants. Illustrated is a typical Cedarapids Intermediate Scalping Unit, using a 4-ft. Symons Cone Crusher. Unit is serving a large Midwest sand and gravel producer.

SYMONS . . . a registered Nordberg trademark known throughout the world.

SYMONS PRIMARY GYRATORY CRUSHERS

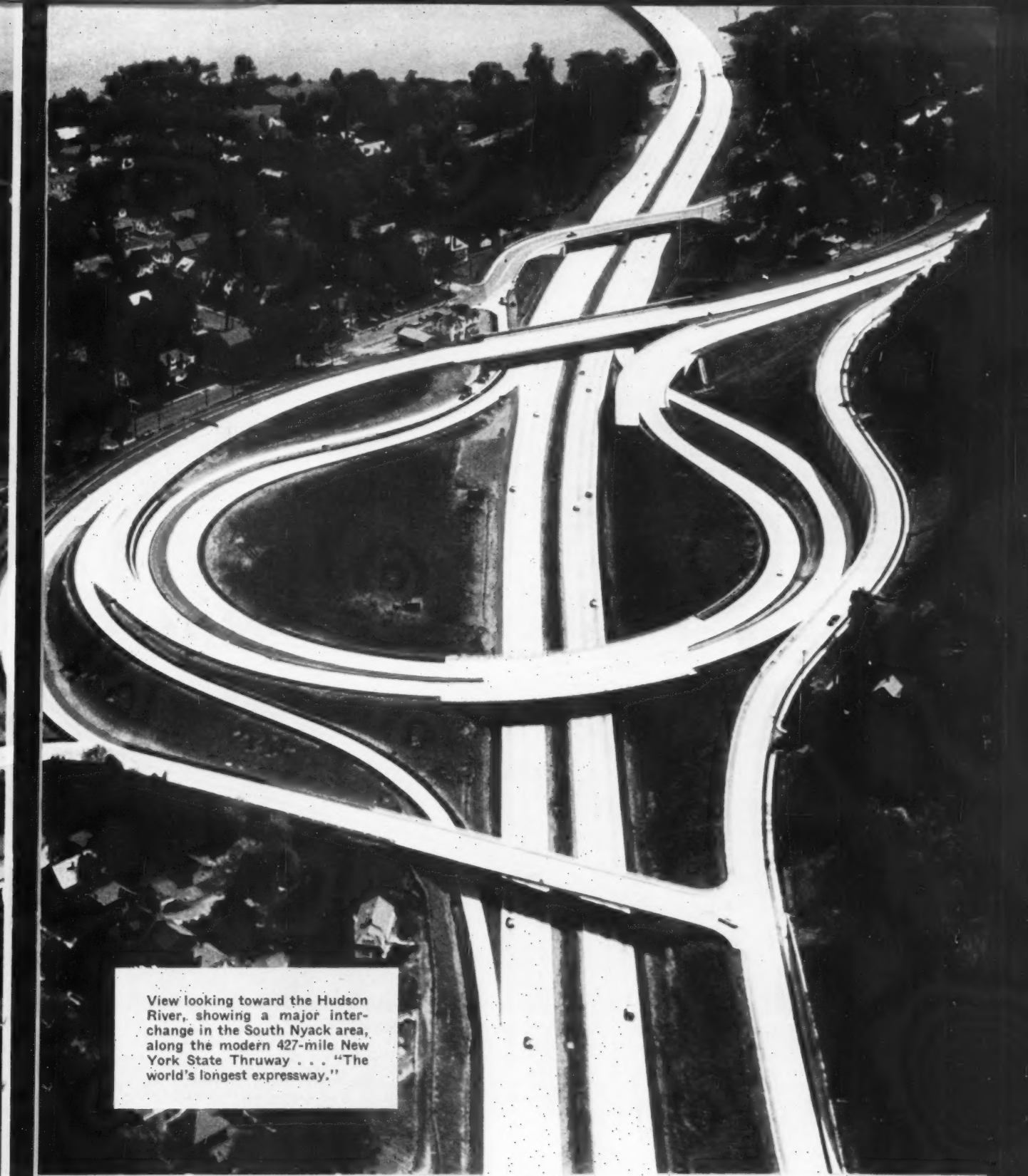
NORDBERG GRINDING MILLS

SYMONS VIBRATING GRIZZLIES

SYMONS VIBRATING SCREENS

ROTARY KILNS and COOLERS

NORDBERG ENGINES



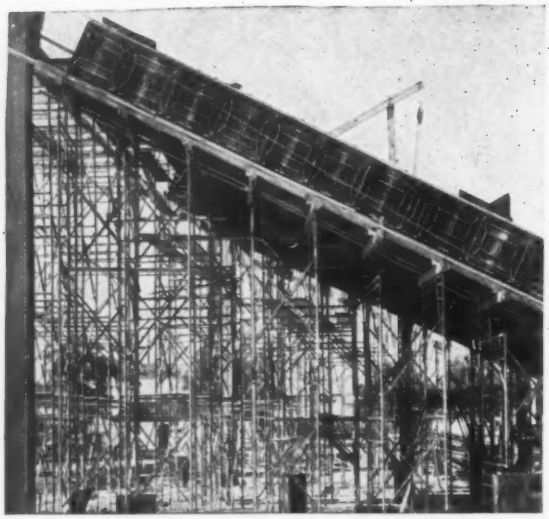
View looking toward the Hudson River, showing a major interchange in the South Nyack area, along the modern 427-mile New York State Thruway . . . "The world's longest expressway."

C558

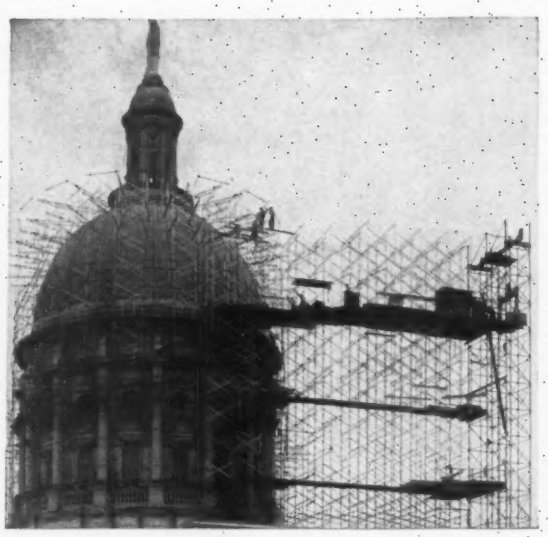
NORDBERG MFG. CO.
Milwaukee 1, Wisconsin

NORDBERG

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS • SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • GENEVA • JOHANNESBURG • LONDON • MEXICO, D. F.



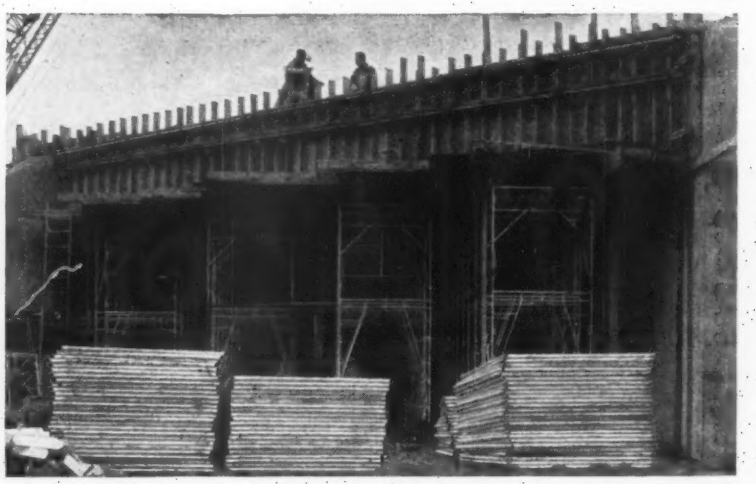
QUICK SHORING FOR RISER GIRDERS—To support concrete riser sections of the new Los Angeles Memorial Sports Arena, contractor, L. E. Dixon Co., quickly assembles "Trouble Saver"® Shoring frames, spaced 5′ apart, to meet slope and weight requirements. Adjustable legs provide exact heights for stringers and form work. Risers average 5″ thick by 1′3″ high, and treads 2½″ thick by 2′8″ wide. Welton Becket and Associates, architect.



EASY ACCESS FOR GOLD DOME WORK—Prefab "Trouble Saver" Sectional Steel Scaffolding components build up rapidly to provide easy access for materials and renovation workers on the State Capitol dome, Atlanta. Thomas Bradbury Assocs., architect. Thompson-Street Co., gen. contr. R. F. Knox Co., sheet metal contr. Local citizens contributed all the gold used on the new dome.

Scaffolding Methods . . . by Patent Scaffolding Co.

EXACT LEVELS PROVIDED—"Gold Medal"® Junior Safety Swinging Scaffolds, hung from the roof give these men exact working levels needed for applying stainless steel facing units. Columbus and So. Ohio Electric Co. bldg. Universal Corp., panel contr.



FAST SUPPORT FOR HIGHWAY BRIDGE—Prefabricated "Trouble Saver" Shoring sections are simply fit together to form towers which are spaced apart to take the required load of the new Webb Hollow Road bridge section of the Empire Stateway, Onondaga Co., N. Y. Wm. F. Bouley Constr. Co., Inc., contractor. Complete, accurate, engineered shoring layouts, supplied by PS Co., provide the safest, most efficient and economical shoring for the job. Included are recommendations for joists, stringers and other necessary components.

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

SALES **RENTALS**

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GOLD MEDAL LADDERS SCAFFOLDING

THE PATENT SCAFFOLDING CO., Inc.

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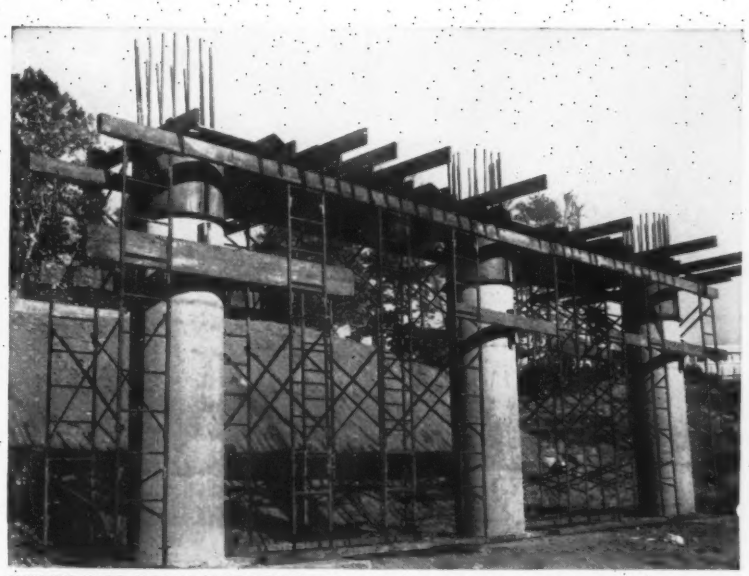
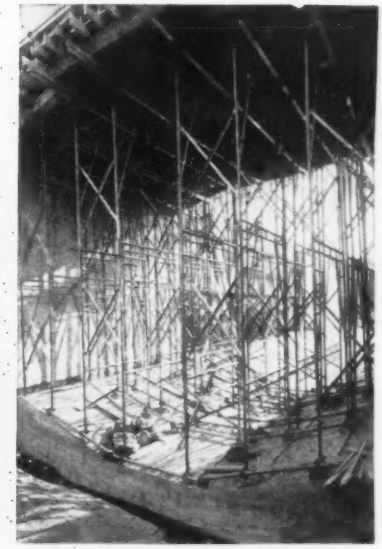
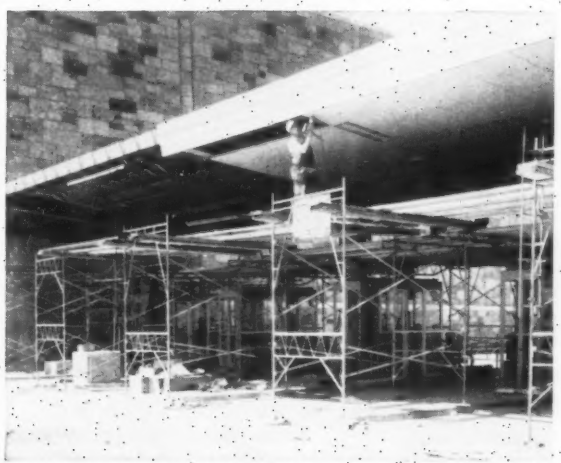


QUICK PIER BEAM SUPPORT—"Trouble Saver" 2'-wide Ladder Scaffold frames spaced 5' apart help contractor, M.D.A. Construction Co. provide easy access for forming work and support for one of 20 bridge piers on the Cross-Westchester Expressway, White Plains, N.Y. This photo shows forming and support for a pier beam 42" x 48" deep, 14' high. Many users of "Trouble Saver" Shoring say "its ease of handling means quicker job completion." Complete, accurate shoring layouts are a regular part of PS Co's engineering service available thru nation-wide offices or representatives that *sell* or *rent* "Gold Medal" Scaffolds.

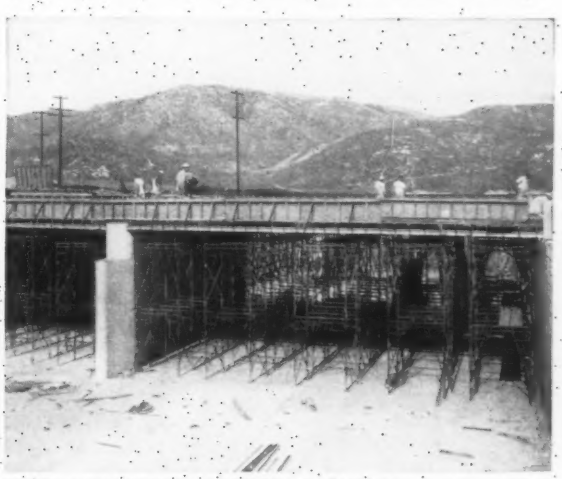


CONFORMING TO CURVES—Guy F. Atkinson Co., contractor, uses "Trouble Saver" Shoring to support Pacific Electric Ry. Co. concrete bridge, Los Angeles, over a sloped concrete channel base. Adjustable legs help meet both curves, top and bottom. Note 4" steel I-beams as stringers, furnished by PS Co.

Shoring Methods . . . for Highway Construction by The Patent Scaffolding Co., Inc.



FINISHING OPERATIONS—On toll booths at the New Jersey Plaza for the New York—New Jersey Lincoln Tunnel these "Trouble Saver" fixed Scaffolds are used to provide safe, level platforms for finishing work. The scaffolding components used here are the same as those used for shoring operations. By assembling them in towers and spacing to take the load, practically any shoring job can be done.



EASILY HANDLED BRIDGE SHORING—5'-wide prefab "Trouble Saver" Sectional Steel Shoring frames are handled easily by the crew for T. M. Page and RCT Corp., joint venturers, to obtain the correct support for the Cajon Blvd. Bridge over Devil's Creek Diversion Channel, San Bernadino, Calif. Two 6'6"-high frames, with extension legs, give 14' height. 4" steel I-beams used as stringers. 3'7" spacing between frames.

FOR GREATER SAFETY... EFFICIENCY... ECONOMY

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nuts, safest, surest way to lock track pads on all CATERPILLAR TRACK ASSEMBLIES!
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Be safe!
Be sure!
DIAMOND
. . . greatest name in
GROUSER STEEL
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And, don't forget GROUSER STEEL. Earnest cuts it to any length you require. Genuine Black Diamond Grouser Steel is your insurance against DOWN-TIME!
EARNEST MACHINE PRODUCTS CO.
Black Diamond Tractor Bolts are acknowledged top quality in the industry. Use them with PAD-LOK Track Shoe Nuts. Write today for complete prices and information on all these quality products.
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tions on end in the trailer bed. The machine can handle five sections of 12-in. pipe at a time. Capacity depends on size of pipe; it ranges down to two 54-in. pipe.

Maximum vertical reach is 13 ft; maximum load, about five tons. The rig cuts average loading time for one truck substantially. Two men, besides the operator, are required for the loading operation.

Dry Ice Shrinks Beam

A crane toppled from an erection trestle during foundation construction at the Chase Manhattan Bank Building in New York and bent a 40-ft-long steel beam in the lower tier of prestressed cross-bracing that supports the walls of the open pit. Joint venture contractors Foundation-Brewster-Miele had to replace the damaged beam with a new section—and impart the same stress to the new member. They did the trick by shrinking the beam with dry ice.

First, workmen braced the damaged area and cut away the bent beam. Then they lowered the new section into place, and built a wood casing around it to hold the 6 tons of dry ice.

After six hours, the temperature of the beam dropped 50 deg, shrinking it ¼ in. Wedges inserted at each end of the beam held the contracted member tightly so that it could not elongate as its temperature rose to normal. When the dry ice was removed, the beam built up stress and thus restored the effectiveness of the cross-bracing system.

one grease for all moving parts

Esso Multi-Purpose Grease H eliminates the need for a variety of special-purpose greases. It protects all types of heavy-duty construction equipment from contamination by moisture, dust and dirt. It's easy to apply by gun or packing . . . yet it keeps all moving parts working free and easy even under the hottest, toughest conditions.

It's extremely economical, too. Esso Multi-Purpose Grease H creates savings in handling and inventory by replacing three or more special greases. And—there's never the danger of using the wrong grease and causing costly damage and down-time.

To get the best performance on your job by using Esso Multi-Purpose Grease H, contact your nearest Esso office in New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, the Carolinas, Tennessee, Arkansas, Louisiana, and the District of Columbia. Or write: Esso Standard Oil Company 15 West 51st Street, New York 19, N. Y.

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Here's the New White Tandem for the Construction Industry...

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EASY ACCESSIBILITY

Maintenance men like the new Whites because of the easy, quick "bench-height" accessibility. Front fender removed easily and quickly.

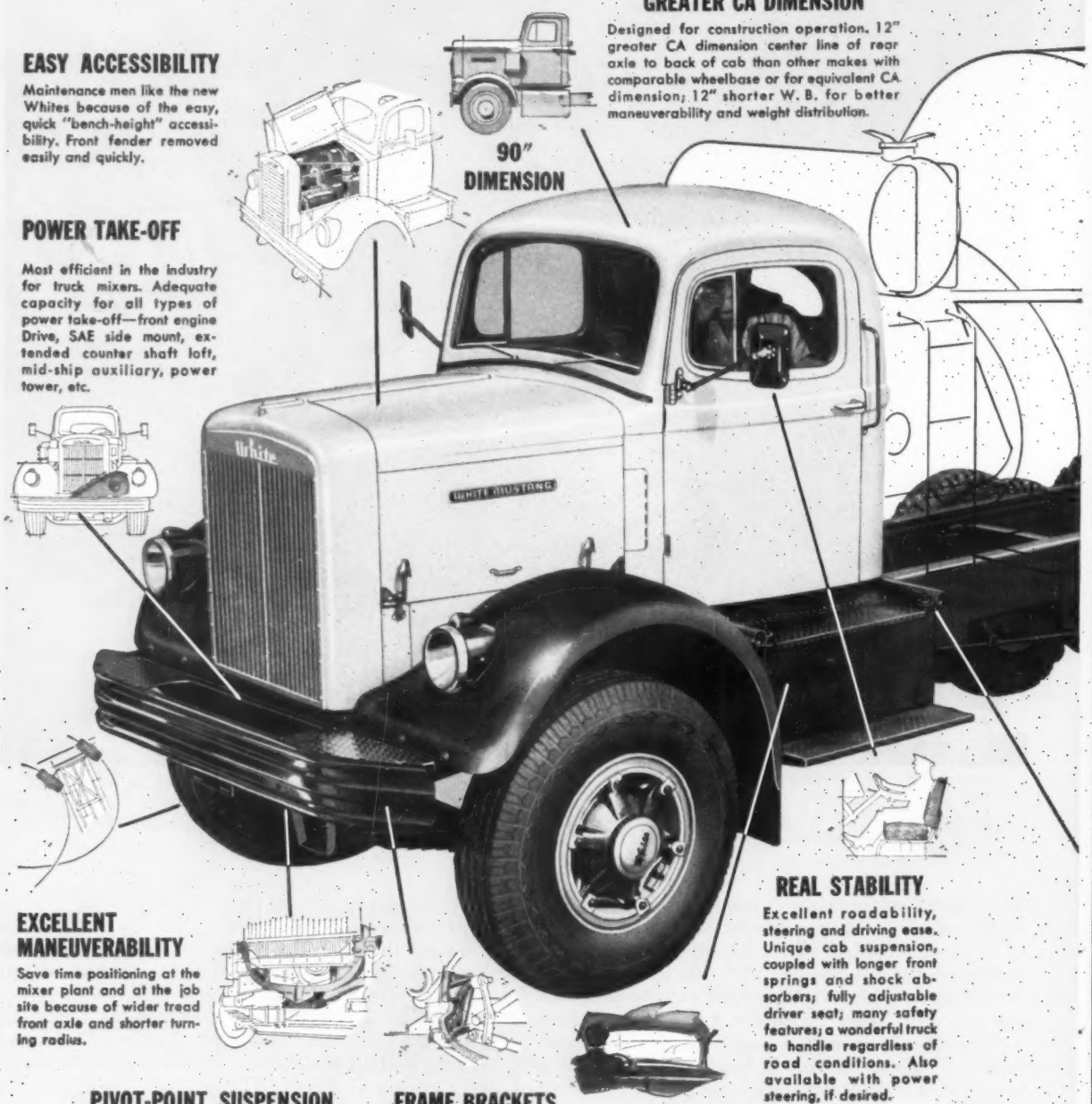
POWER TAKE-OFF

Most efficient in the industry for truck mixers. Adequate capacity for all types of power take-off—front engine Drive, SAE side mount, extended counter shaft loft, mid-ship auxiliary, power tower, etc.

GREATER CA DIMENSION

Designed for construction operation. 12" greater CA dimension center line of rear axle to back of cab than other makes with comparable wheelbase or for equivalent CA dimension; 12" shorter W. B. for better maneuverability and weight distribution.

90" DIMENSION



EXCELLENT MANEUVERABILITY

Save time positioning at the mixer plant and at the job site because of wider tread front axle and shorter turning radius.

REAL STABILITY

Excellent roadability, steering and driving ease. Unique cab suspension, coupled with longer front springs and shock absorbers; fully adjustable driver seat; many safety features; a wonderful truck to handle regardless of road conditions. Also available with power steering, if desired.

PIVOT-POINT SUSPENSION

Radiator, fenders and assemblies are supported in a "U"-shaped channel structure and anchored to a rubber-cushioned center support that make them unaffected by frame twist or road shock.

FRAME BRACKETS

Husky, sturdy, multi-functional high-strength frame brackets. Alloy cast steel used at critical stress points.

STEERING STABILITY

Ideal steering geometry improves stability and gives radius rod action. Front springs are anchored firmly at front and shackled at rear.

IT FOR *YOU!*

ALL-BOLTED CONSTRUCTION

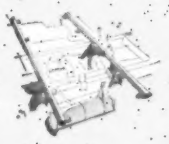
Heat treated body-fit bolts with lock nuts fill the hole exactly and permit use of higher strength material than it is possible to use with rivets.

THE RIGHT TANDEM

Engineered to your work requirements in single reduction, doubled reduction hypoid, double reduction planetary, with applicable axle ratios and your own choice of suspension.

FRAME 40% STRONGER

Double channel frame of chrome manganese heat treated steel with triple liner reinforcement to add strength and last longer.



TUBULAR CROSS-MEMBERS

More strength in the chassis, less vibration in the cab mounting because of multi-purpose tubular cross-members that are so rigid and durable.

These *big* differences make WHITE your most profitable choice because WHITES are custom-engineered for mixers and other construction equipment in your service.

Here's an even dozen reasons why it's time you looked into the extra profit opportunities of these new Whites.

There are many more! Because these man-sized Whites for construction assignments are built right to *your* business—built right for the tough work assignment they're bound to get for the ruggedness you need.

Why not have your White Representative give you the complete story of the *extra* work-ability of these husky Whites — when engineered to your exact operating requirements.

It explains why so many truck-users across the nation are going White—now!

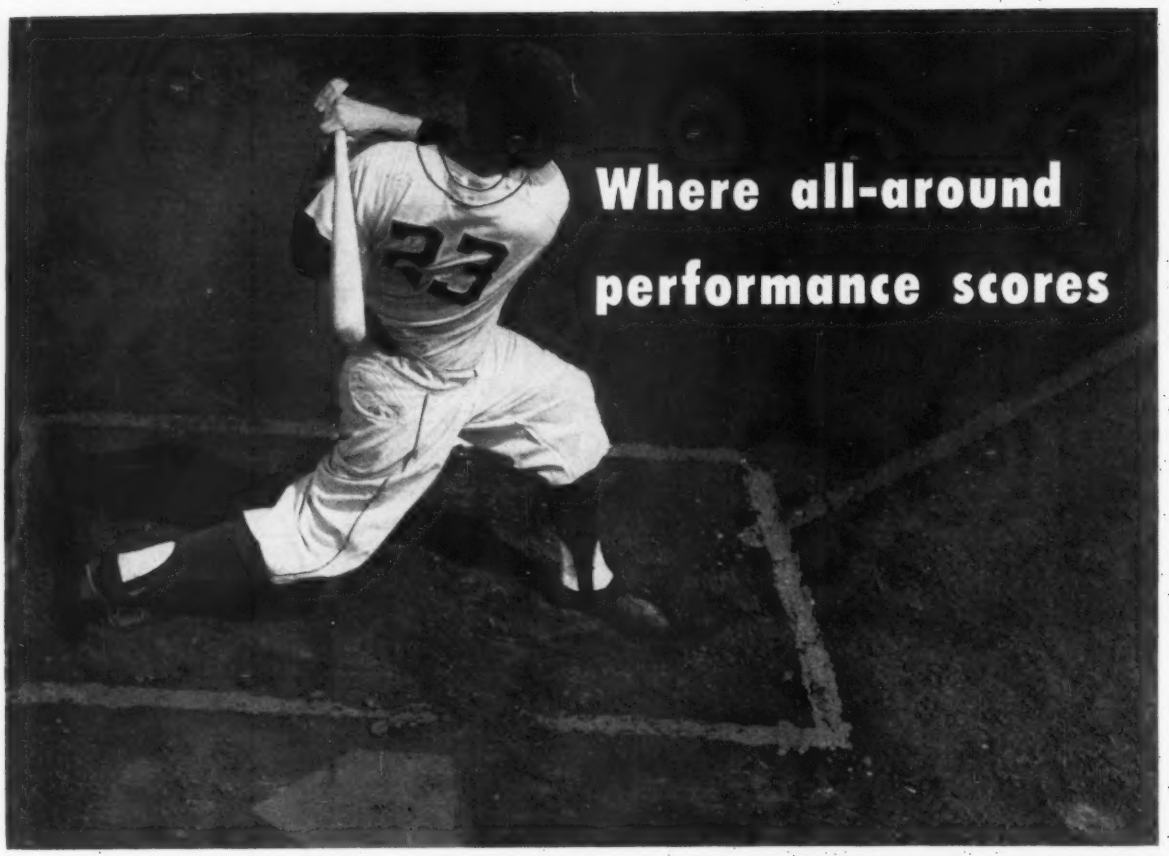
See what's in it for you!

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

White

The Greatest Name in Trucks

THE TRUCK THAT KNOWS YOUR BUSINESS



Permalube All-Purpose Grease #158 serves many purposes, proves best for chassis lubrication, universal joints, water pumps and wheel bearings.

Permalube All-Purpose Grease #158 is a highly water resistant, high melting point, lithium soap grease. It is a multi-purpose lubricant. It proves outstanding for chassis lubrication, universal joints, water pumps and wheel bearings.

This multi-use, high quality lubricant assists users in cutting down on the number of greases carried. Thus, with Permalube All-Purpose Grease #158 available, a single product does the job. It is not necessary to carry an inventory of separate lubricants for chassis lubrication, universal joints, water pumps and wheel bearings. Truly, Permalube All-Purpose #158 is a multi-purpose grease.

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Amoco Superior Diesel Oils, S-1, S-2, S-3
Permalube Gear Oil
Perma-Flow Oils
Vesuvius "X" Gear Compounds

Lorains speed work on $31,000,000 section of Ohio Throughway

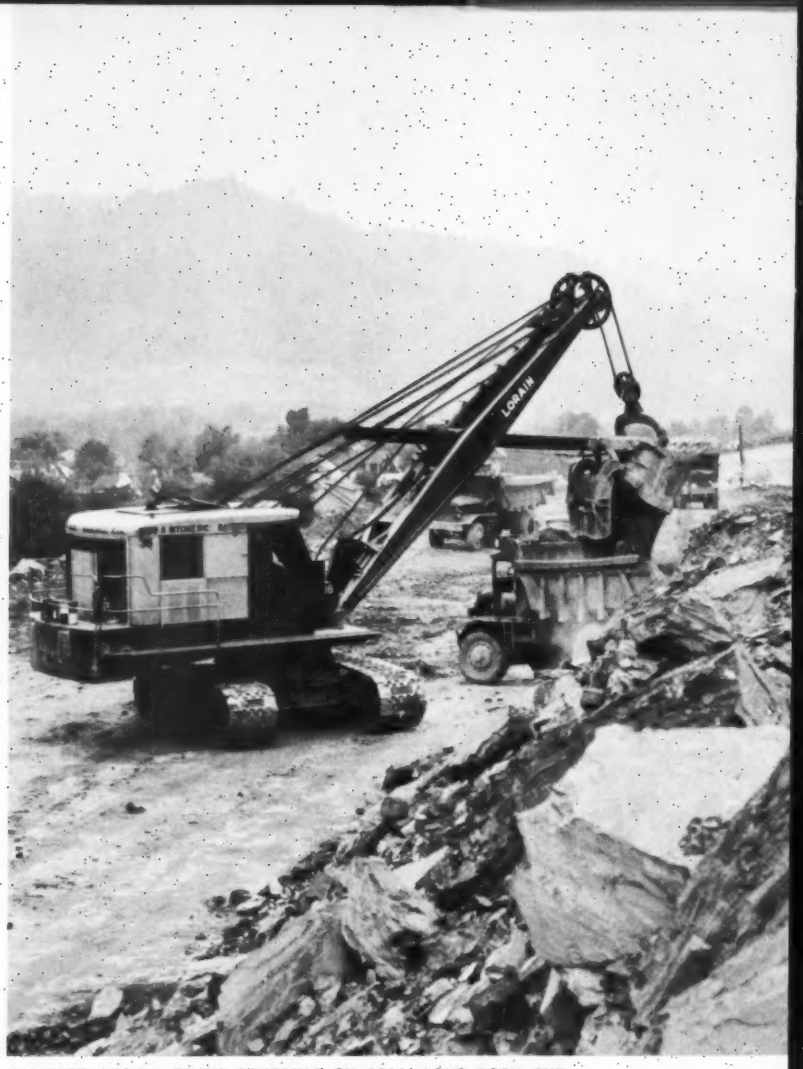
35-TON MOTO-CRANE DRIVES 70-FOOT PILES FOR BRIDGE ABUTMENT SUPPORTS. One of three Lorains that Casey Construction Company of Pittsburgh, Pennsylvania uses to build five bridges, the MC-530W is equipped with a 75-foot boom to handle a hammer attachment and 50 feet of leads. Stanley Kraica, pile foreman, reports that the tandem front end of the Lorain carrier lets them "move easily over muddy terrain." Casey has purchased 19 Lorains.

A LORAIN HOE HELPS DIG OVER 11,000 FEET OF DRAIN PIPE DITCHES ranging from 8 to 10 feet deep. Harrison Construction Company, also of Pittsburgh, Pennsylvania is using five Lorains to move 1,700,000 yards of earth and for bridge building. C. E. Schreiber, assistant general superintendent reports that Harrison has standardized on Lorain because they are all 'round rigs that can handle both rock and dirt equally well. Harrison has purchased 57 Lorains.

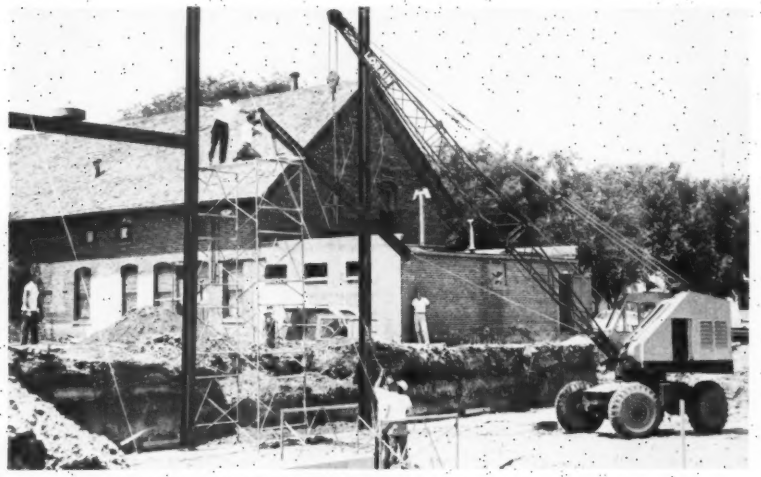
WHEREVER THERE'S IMPORTANT CONSTRUCTION, YOU'LL FIND

LORAIN ON THE MOVE

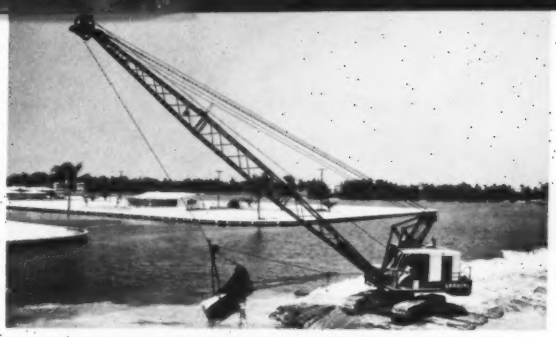
Construction moves ahead faster with Lorains on the job



2½-YARD SHOVEL BEATS SCHEDULE ON 2200' LONG ROCK CUT. Digging shale and sandstone with densities of up to 3,000 pounds per yard, this Lorain 85-A averages 2,000 yards each ten hour day working on the U. S. Highway 60 relocation job south of Charleston, West Virginia. With this and another 2½-yard Lorain, Boso and Ritchie, Inc. of Ravenswood, West Virginia have moved over 75% of the required 525,000 cubic yards in just over 50% of the time allotted for the project. Twenty-eight Lorains have paid off for Boso and Ritchie over the past 35 years.



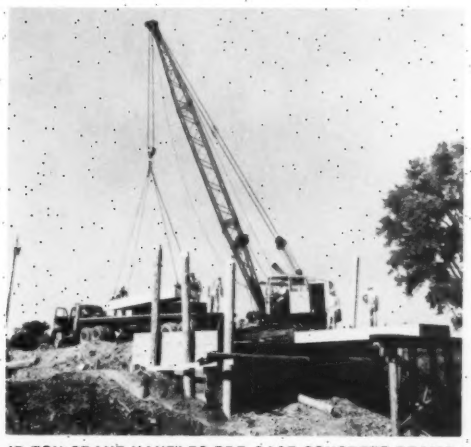
SELF-PROPELLED CRANE HELPS ERECT GYM. In working on the construction of a high school gymnasium, Behlen Manufacturing Company of Columbus, Nebraska uses their versatile 7-ton SP-107 self-propelled crane to set steel and wall panels. John Mansback, operator, reports that he likes the hydraulic clutch controls. The SP-107 has full rated lifting capacities through 360 degree swing—no outriggers needed.



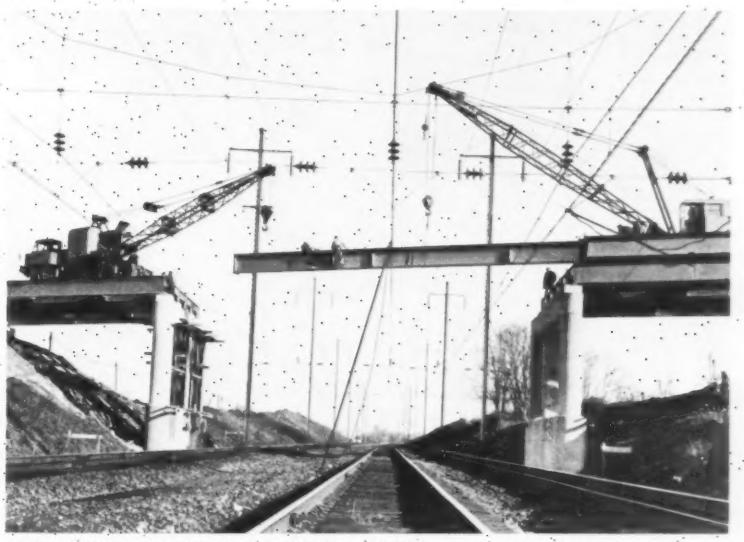
3-YARD DRAGLINE DIGS CHANNEL OUT OF CORAL ROCK. The job: digging 4½ miles of channels, 200 feet wide and 25 feet deep for a $75 million residential project in Florida. The rig: an 85-A owned by Layne, Inc. of Florida. The 70-foot boom, of Lorain's exclusive square-tubular-chord design, is lighter, stronger, permits operating with longer, flatter booms. Ideal for big dragline jobs.

2½-YARD CLAMSHELL SPEEDS CREEK DREDGING. Using a clamshell bucket on a 60-foot boom, this 85-A dredges a creek and establishes a gravel bed for a double box section concrete sewer. The 13th Lorain for W. L. Harper Construction Company of Cincinnati, Ohio, this crane has Shear-Ball mounting for "ball bearing" swings, "Joy-Stick" "metered" air clutch controls, lighter, stronger, square-tubular-chord boom.

MOTO-CRANE DOES THREE JOBS FOR ONE PROJECT. Featuring Lorain's all-new rugged 8 x 4 carrier, this new, 30-ton MC-430 Moto-Hoe digs trenches and excavates foundations for a water treatment plant near Berkeley, California. Owner C. Norman Peterson, Inc. of Berkeley also uses this new Lorain as a crane for pouring concrete. Solid rocker beam front axle bogie increases lifting capacities, gives better soft ground flotation, better axle loadings.



17-TON CRANE HANDLES PRE-CAST CONCRETE BEAMS. McElroy Construction Company of Decatur, Illinois uses its Lorain-26 on an extra-wide crawler to place reinforced concrete beams on a highway bridge job. Equipped with a 50-foot boom and spreader sling, the "26" works at a 20-foot radius in handling the 6-ton lifts. The square-tubular-chord boom is stronger, though lighter to permit long reaches, increased capacities.



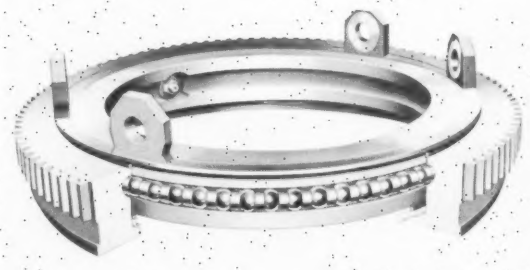
TWO LORAINS EASE I-BEAM BETWEEN WIRES. A 35-ton Lorain Moto-Crane teams up with a 30-ton Lorain Moto-Crane for precision handling of an I-beam for Aycock, Inc. of Camp Hill, Pennsylvania. This is the center section of a 177 foot span of a new bridge on the Lancaster-Reading highway. In addition to these two cranes Aycock owns another 30-ton Moto-Crane and a 22½-ton Moto-Crane.

HOW LORAIN'S EXCLUSIVE FEATURES COMBINE TO BUILD YOUR PROFITS

SQUARE-TUBULAR-CHORD BOOM PAYS OFF ON HOSPITAL CONSTRUCTION JOB. Vest and Bartell Company of Cincinnati, Ohio, puts the 25-ton Lorain-56 through its paces digging a 22-foot-deep basement and pouring concrete running wall.

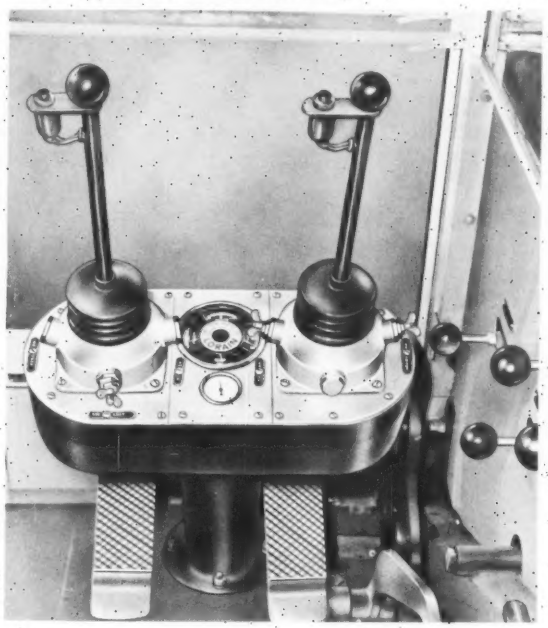
Working with clamshell, dragline and concrete buckets, the square-tubular-chord boom provides capacity to spare. Made of special alloy steel, the boom is built with main chords of square tubing, lacings of continuous round tubing welded at common points to the chords. This creates an extra-strong "banding" effect.

"JOY-STICK" CONTROLS AND SHEAR-BALL MOUNTING BOOST OUTPUT. This job required using a 90-foot boom at times, at extra-wide radii—a real test for stability. Shear-Ball mounting provided a smooth, rock steady swing. "Joy-Stick" air power controls furnished easier, smoother response to cut operator fatigue. Results: faster operation, more work per day, better profits.



SHEAR-BALL MOUNTING eliminates center pin and nut, centering gudgeon, hook or top rollers, exposed roller path with their adjustment, lubrication and maintenance problems.

"JOY-STICK" CONTROLS require only two levers to apply "metered" air power to all turntable clutches for easier, simpler operation, increased production.



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THE THEW SHOVEL COMPANY, LORAIN, OHIO

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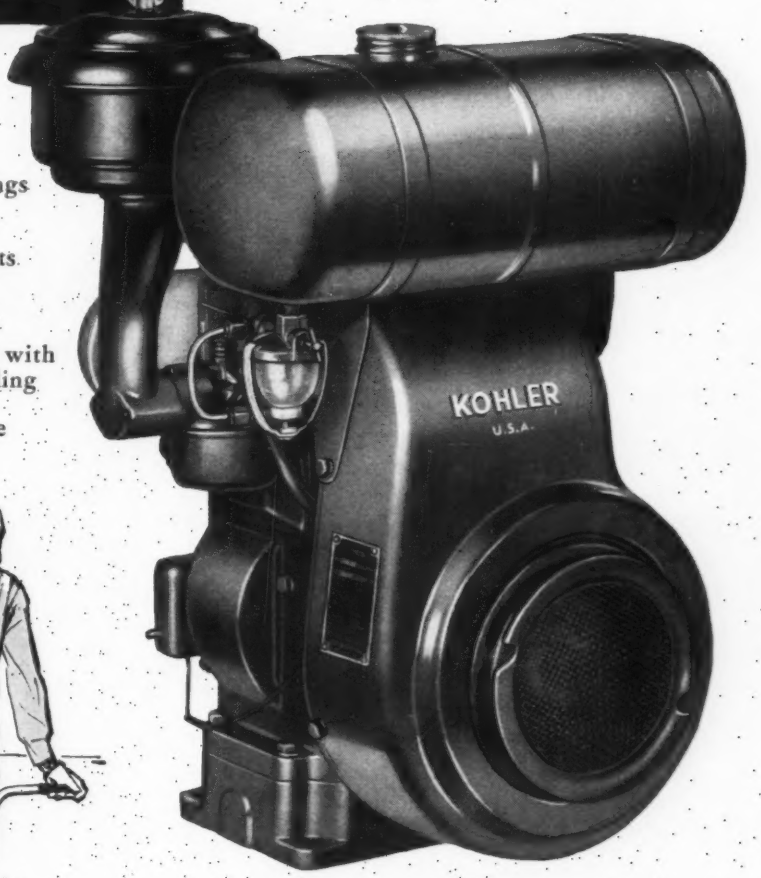
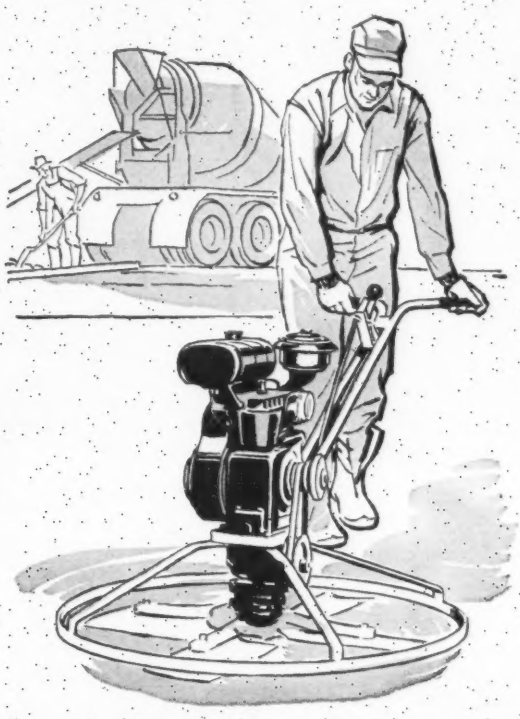
4-CYCLE SHORT-STROKE AIR-COOLED

MODEL
K160

- Balanced crankshaft—ball bearings at both ends
- Externally mounted breaker points
- Positive splash lubrication
- Aluminum alloy cylinder head with deep fins spaced for efficient cooling
- Mechanical governor for accurate R.P.M. control





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Kohler engines, conservatively rated, will do the jobs for which they are recommended.

Kohler quality—recognized and respected throughout the world—is built into every engine.

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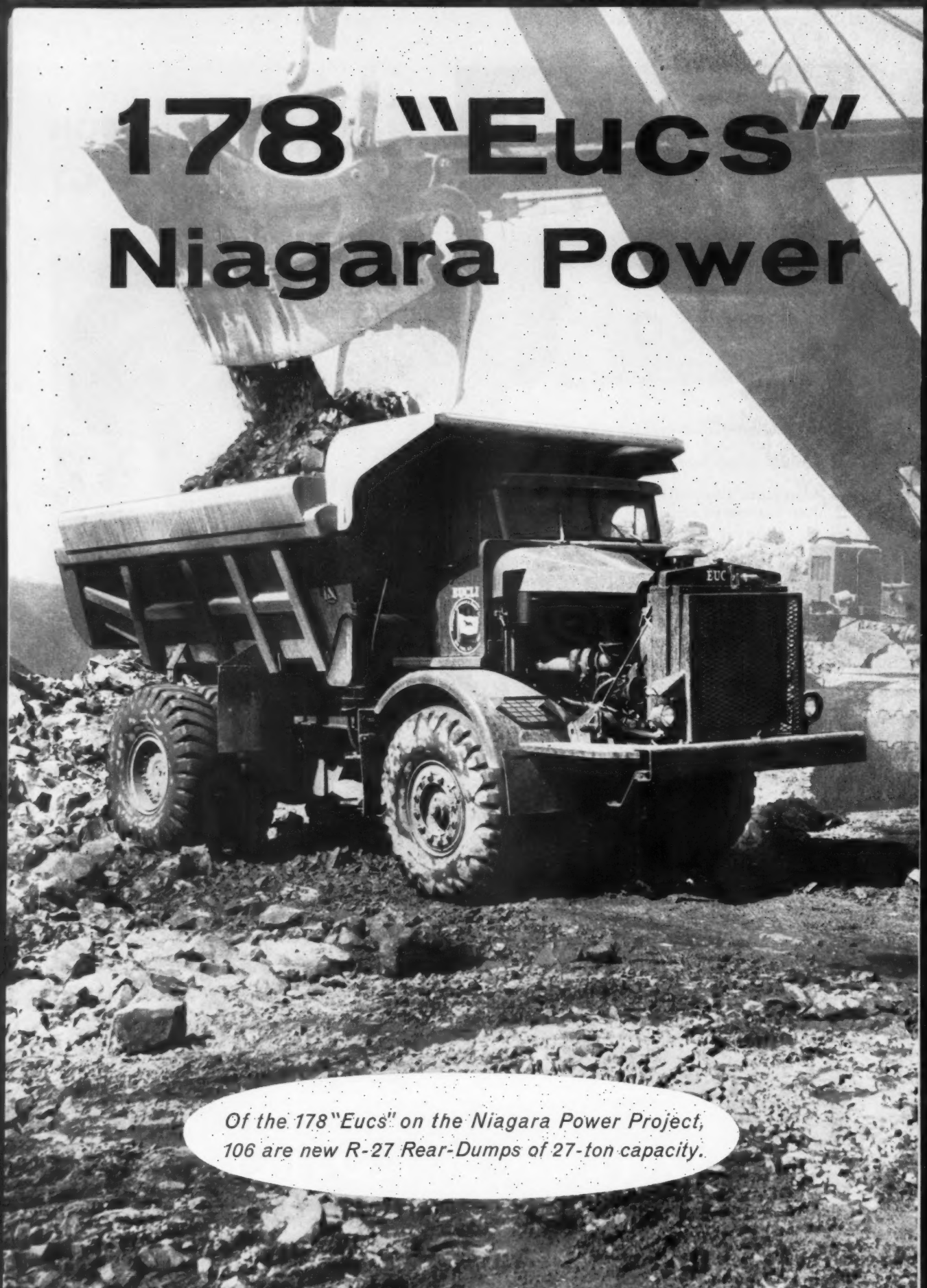
178 "Eucs" Niagara Power



Of the 178 "Eucs" on the Niagara Power Project, 106 are new R-27 Rear-Dumps of 27-ton capacity.

Working on the Project

Gull Contracting & L. G. Defelice are using 36 of these 27-ton "Eucs" on their 4½ million yd. channel excavation work.

"Twin" Scrapers in the Euclid fleet of Channel Constructors help remove overburden from rock that will supply the big aggregate plant.

Balf-Savin-Winkelman have Rear-Dump and Bottom-Dump "Eucs" in their fleet. Earth excavation for the two inlet channels is hauled in 12 bottom-dumps.

THE $625 million Niagara Power Project being constructed by the Power Authority of the State of New York is one of the world's greatest hydro-electric developments. When completed in 1962, the project will produce well over 2 million kilowatts of electricity from water that now flows unproductively over Niagara Falls . . . that's enough to supply the household needs of a city the size of Chicago —with over 3½ million population!

Consisting of five different sections, all phases of this tremendous job are now under contract. Although much of the work is still in the preliminary stage there are Euclids on every section—a total of 178 of them already! With many millions of tons of rock excavation to be moved, Rear-Dump "Eucs" predominate, but big Bottom-Dumps and "Twin" Scrapers are also being used. Contractors on 4 of the 5 sections have purchased a total of 106 new R-27 Euclids for their work. With 325 or 335 h.p. engine, 4-speed Torqmatic Drive, converter lock-up, and 18.00 x 25 tires all around, this new "Euc" moves 27-ton loads on steep grades and tough hauls.

These contractors are using "Eucs" on all 5 sections:

Merritt-Chapman & Scott Corp.	**64**
Channel Constructors (Peter Kiewit Sons Co., Perini Corp., Morrison-Knudsen Co. Inc., and Walsh Const. Co.)	**37**
Gull Contracting & L. G. Defelice	**36**
Edw. Balf Co., Savin Bros., D. W. Winkelman	**41**

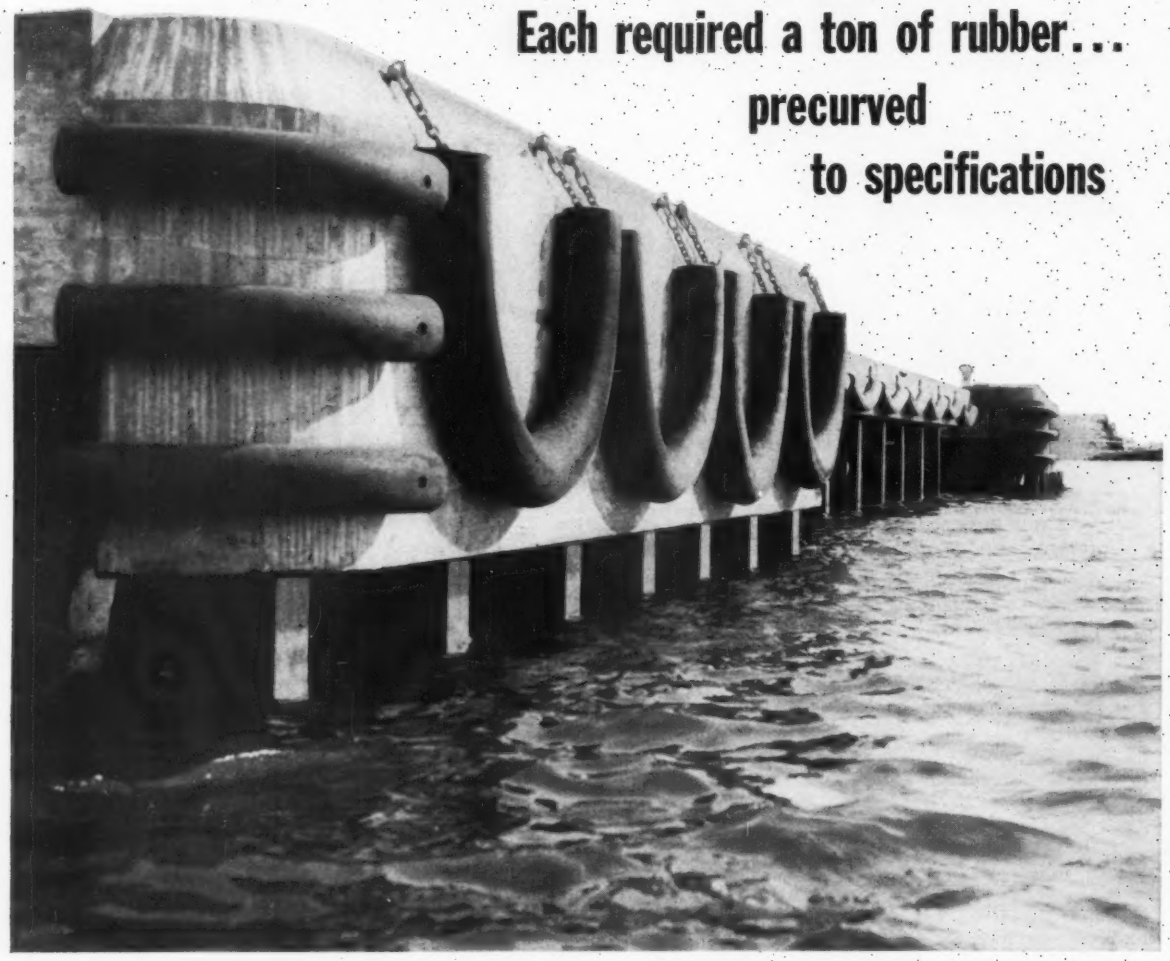
Euclid equipment has proved its ability to maintain high production at low cost for over 25 years . . . on big, rush projects like this one and on smaller mining and construction operations, too. For reasons why "Eucs" are *your* best investment see your Euclid dealer before you figure that next job!

EUCLID
Division of General Motors Corp.
Cleveland 17, Ohio

US RUBBER MARINE FENDERS

LARGEST EVER MADE!

Each required a ton of rubber... precurved to specifications



PROTECTORS against ship-to-shoreside hazards! As a ship pulls alongside a dock anything can happen. A stiff breeze can damage a ship or crumple a dock, causing costly damage. That is, unless both ship and dock are cushioned against impact load with U. S. Rubber Marine Fenders. These huge bumpers can take a tremendous and continual beating, absorbing every possible contact shock.

SEND for our technical catalog. It contains marine fender dimensions, shock absorption data and other engineering facts which enable the engineer to write in marine fender specifications and materially reduce construction costs, both new or for modernization. Write Department ENR, Mechanical Goods Division, United States Rubber, Rockefeller Center, N.Y. 20, N.Y. In Canada, Dominion Rubber Co., Ltd.

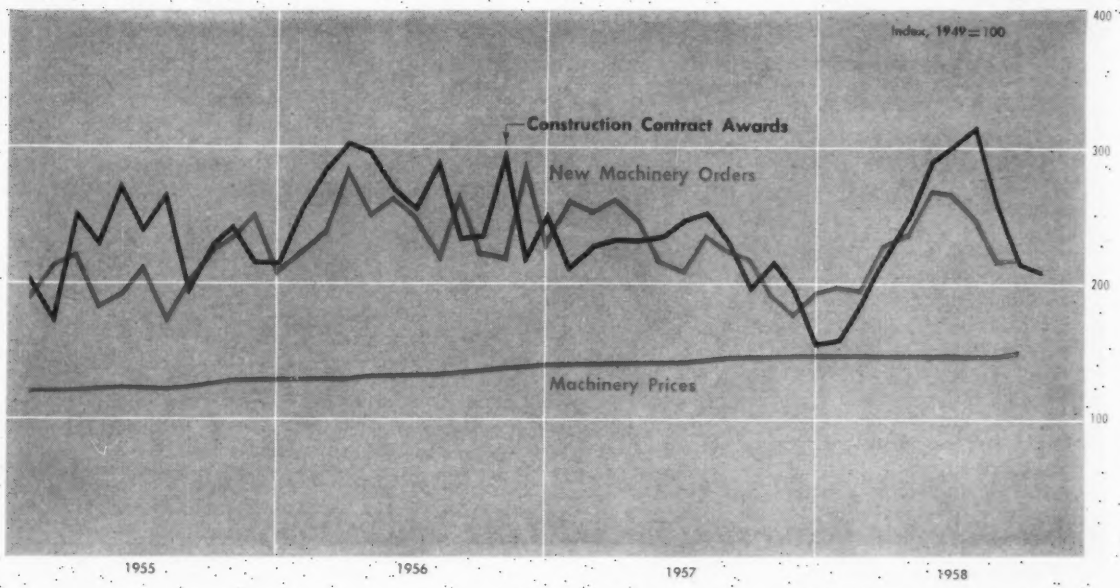
US RUBBER Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Trends in the Machinery Market



Price Index

	SEPT 1958	MONTH AGO	YEAR AGO	% CHANGE 1957-1958
All Types of Equipment	165.9	165.6	162.7	+2.0
Cranes; Draglines, Shovels	**165.2**	**163.8**	**160.8**	**+2.7**
Shovel, ½ cu yd	155.9	154.0	151.5	+2.9
Shovel, ¾ cu yd	169.2	167.7	164.5	+2.9
Shovel, 1-1½ cu yd	180.7	178.4	174.3	+3.7
Shovel, 2-2½ cu yd	156.6	154.4	148.2	+5.7
Shovel, 3-3½ cu yd	162.7	162.7	158.3	+2.8
Shovel, 6 cu yd	182.2	180.1	179.5	+1.5
Crane, truck mounted	164.2	164.2	162.1	+1.3
Crane, tractor mounted	135.1	135.1	131.7	+2.6
Bucket, clam shell	152.7	152.7	152.7	0
Bucket, dragline	180.8	180.8	180.8	0
Scrapers and Graders	**158.8**	**158.8**	**157.9**	**+0.6**
Scraper, 4 Wheel, 8-10.5 cu yd	155.0	155.0	155.0	0
Scraper, 4 Wheel, 12-15 cu yd	151.3	151.3	151.3	0
Scraper, 2 Wheel, 14-18 cu yd (a)	122.7	122.7	118.4	+3.6
Grader, heavy duty	164.0	164.0	163.1	+0.6
Grader, light & medium	161.2	161.2	161.2	0
Tractors (non-farm, incl industrial)	**180.5**	**180.5**	**176.7**	**+2.2**
Wheel-type, off highway (a)	128.4	128.4	122.1	+5.2
Crawler-type; 45-60 dhp	182.7	182.7*	180.0	+1.5
60-80 dhp	185.8	185.8	183.6	+1.2
80-120 dhp	186.7	186.7	182.4	+2.4
120 and up dhp	191.8	191.8	186.7	+2.7
Machinery, Tractor Mounted	**161.7**	**161.7**	**160.4**	**+0.8**
Dozer, cable controlled	151.6	151.6	151.6	0
Dozer, hydraulic controlled	177.3	177.3	175.1	+1.3
Cable power control unit	147.9	147.9	147.9	0
Loader, shovel type	153.9	153.9	151.8	+1.4
Specialized Machinery	**150.7**	**150.7**	**147.0**	**+2.5**
Ditcher	154.1	154.1	154.1	0
Roller, tandem	193.2	193.2	181.7	+6.3
Roller, 3 wheel	161.6	161.6	161.6	0
Ripper and rooter	143.3	143.3	143.3	0
Dewatering pump, 10 M gph	111.7	111.7	110.1	+1.5
Dewatering pump, 90 M gph	144.3	144.3	135.6	+6.4
Portable Air Compressors	**159.1**	**159.1**	**159.1**	**0**
Contractor's Air Tools	**164.5**	**164.5**	**164.3**	**+0.1**
Mixers, Pavers, Spreaders	**150.1**	**150.1**	**145.3**	**+3.3**
Mixer, portable, 11 cu ft	160.1	160.1	155.4	+3.0
Mixer, portable, 16 cu ft	163.7	163.7	159.6	+2.6
Mixer, truck, 6 cu yd	127.3	127.3	122.1	+4.3
Mixer, paving, 34 cu ft	185.3	185.3*	174.6	+6.1
Concrete finisher & spreader	181.5	181.5	173.0	+4.9
Bituminous distributor	122.4	122.4	115.9	+5.6
Bituminous spreader	160.3	160.3	160.3	0
Bituminous paver	153.0	153.0	155.3	−1.5
Off-Highway Trucks, Wagons (b)	**99.9**	**99.0**	—	—
Contractors off-highway truck (b)	99.9	99.0	—	—
Trailer dump wagon (b)	100.0	100.0	—	—

• a January, 1955=100 • b January, 1958=100 * Revised
BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49=100

Manufacturers Hike Equipment Prices

The longest period of stable construction equipment prices since 1954 ended last month as key manufacturers posted increased prices. More firms are expected to follow suit this month.

The latest value of the BLS index of manufacturers prices reflects a small part of the increase contractors will have to pay because the index is dated September 15, before the upswing got rolling. Moreover, BLS indexes show prices moving up only on shovels, whereas the current wave of increases applies to most major types of equipment.

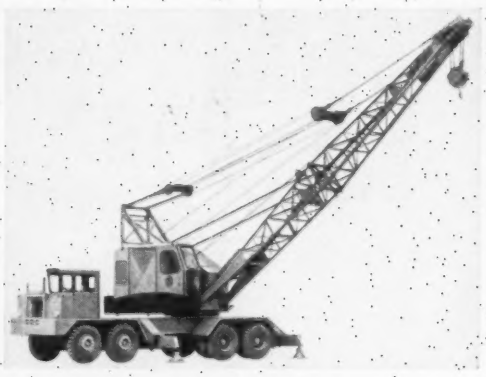
Among the leaders in the parade to higher construction equipment prices are Bucyrus-Erie, Euclid Division of General Motors, Heltzel Steel Form & Iron Co., International Harvester, and Oliver Corp. Other equipment makers had no definite word on price changes, but several expected increases. Baldwin-Lima-Hamilton, Marion, Harnischfeger, and Barber-Greene are also likely to boost prices.

No word on any price increases for construction equipment was available from Allis-Chalmers, Blaw-Knox, Caterpillar Tractor, or Mack Truck. Of these, all but Blaw-Knox were involved with labor negotiations. Outcome of these talks may influence Allis-Chalmers and Caterpillar prices.

Increases already posted include: Bucyrus-Erie crawler power shovels up 3%; Euclid's TC-12 up 3%, tractor scrapers up 2.4% to 4.6%, and rear dump trucks up 4.7% to 7%; Heltzel concrete batching and finishing equipment up about 5%; and International Harvester crawler tractors up 5%, wheel tractors (except one model) up 5.8%, and heavy duty trucks up an average of 2.5% though prices for some types were reduced or unchanged.

$14,000,000 sewer project — Working on a section of a 14 million dollar metropolitan sanitary sewer, Koehring® 605 dragline (left) scoops a wide ditch out of loose, shifting sand. It was teamed up with another Koehring 605 (a 36-ton crane), which set concrete pipe into place. Notice size of giant sewer line in foreground.

Fills a production gap — Here is a special size machine in the Koehring line that fills an important production gap on many jobs — big, heavy-duty 805. Capacities: 2-yard shovel — 2 to 3-yard clamshell or dragline with 50 to 150-foot boom — 52-ton crane (based on 75% rating).



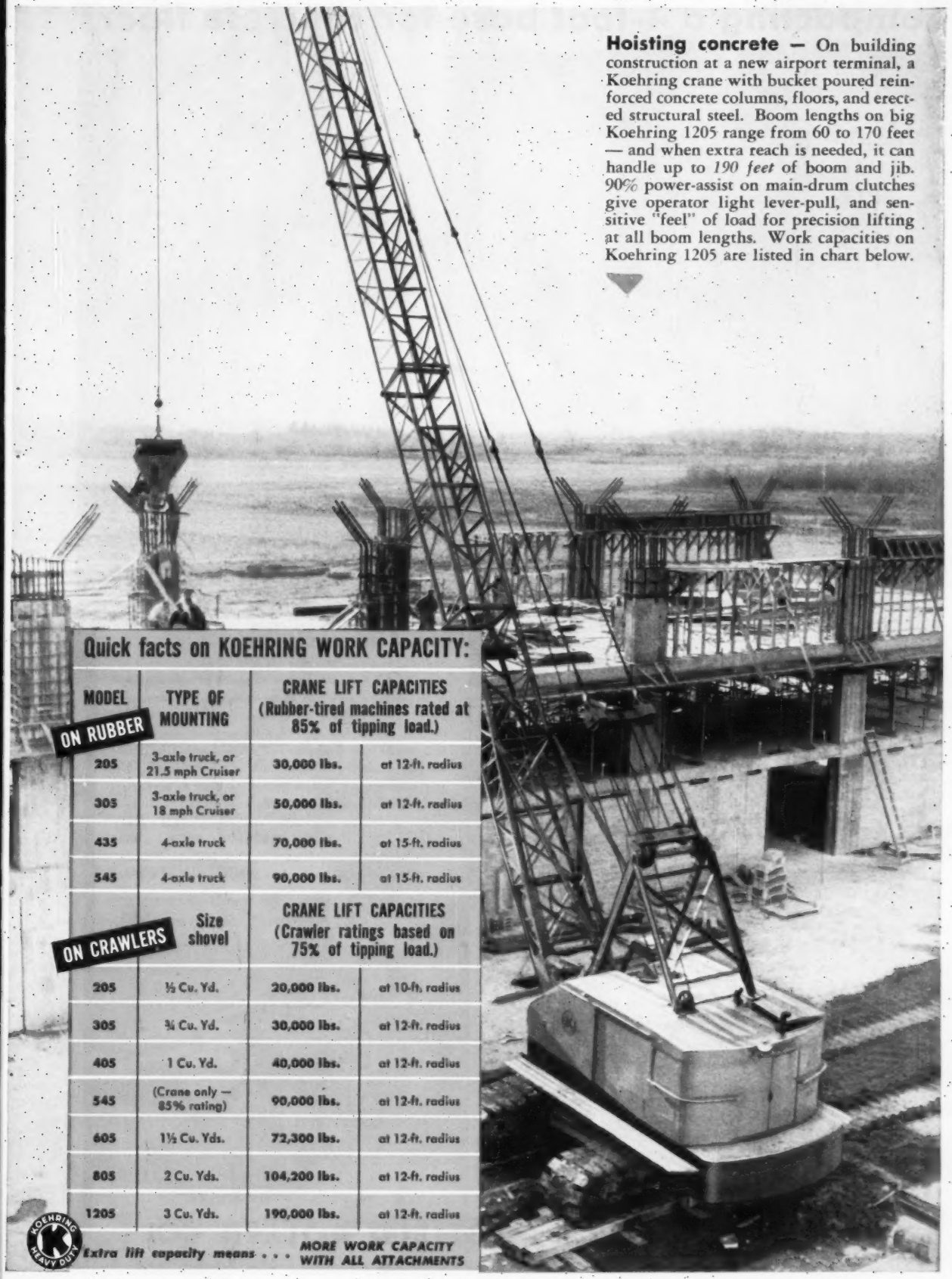
Introducing . . . the new 435 Latest addition to the big Koehring line on rubber, this new 435 truck crane safely lifts up to 35 tons (with 40-foot boom at *15-foot* radius). That's based on conservative 85% rating. It quickly converts from fully equipped machine to roadable machine — removable counterweight, boom, outriggers reduce weight for highway travel.

Check the chart — pick the size and type that best fits your needs — then phone Koehring distributor for a demonstration.

K851

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wisconsin

Koehring excavators and cranes also manufactured in: CANADA • ENGLAND • SPAIN • JAPAN



Hoisting concrete — On building construction at a new airport terminal, a Koehring crane with bucket poured reinforced concrete columns, floors, and erected structural steel. Boom lengths on big Koehring 1205 range from 60 to 170 feet — and when extra reach is needed, it can handle up to *190 feet* of boom and jib. 90% power-assist on main-drum clutches give operator light lever-pull, and sensitive "feel" of load for precision lifting at all boom lengths. Work capacities on Koehring 1205 are listed in chart below.

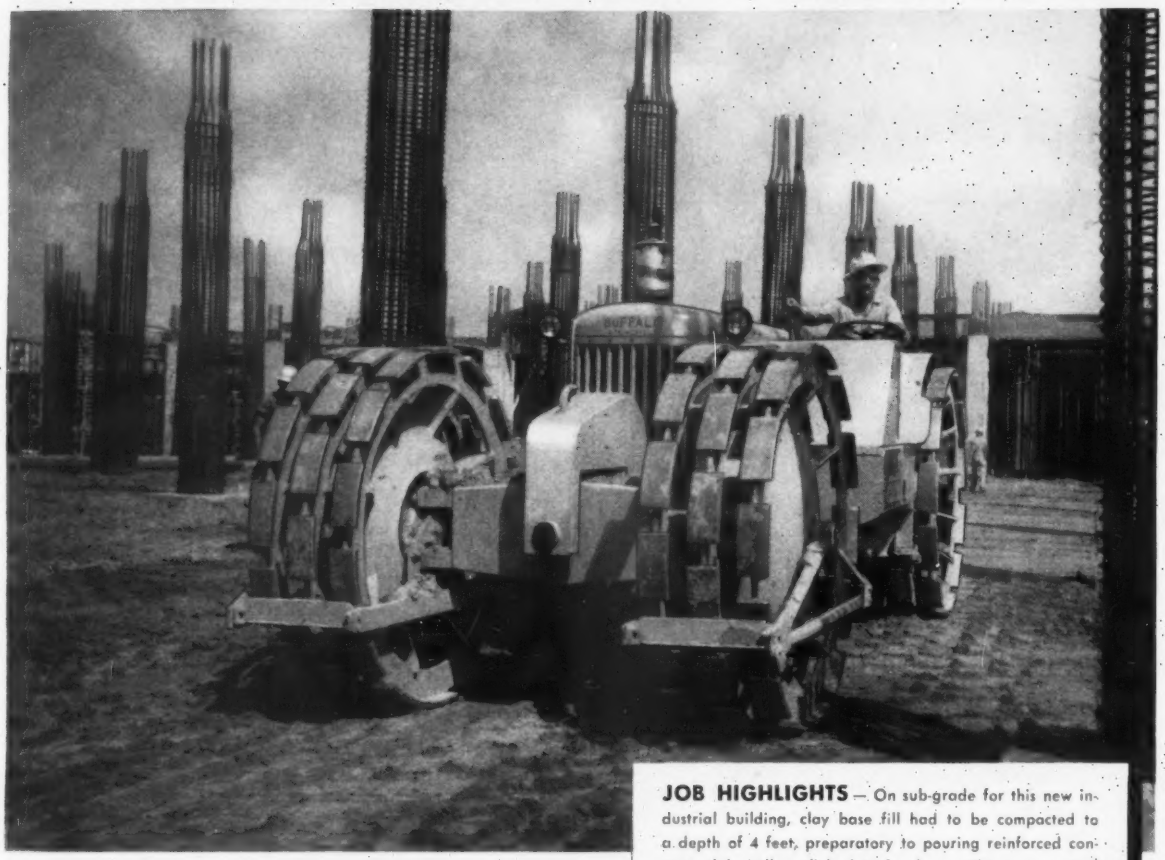
Quick facts on KOEHRING WORK CAPACITY:

MODEL	TYPE OF MOUNTING	CRANE LIFT CAPACITIES (Rubber-tired machines rated at 85% of tipping load.)	
ON RUBBER			
205	3-axle truck, or 21.5 mph Cruiser	30,000 lbs.	at 12-ft. radius
305	3-axle truck, or 18 mph Cruiser	50,000 lbs.	at 12-ft. radius
435	4-axle truck	70,000 lbs.	at 15-ft. radius
545	4-axle truck	90,000 lbs.	at 15-ft. radius
ON CRAWLERS	Size shovel	CRANE LIFT CAPACITIES (Crawler ratings based on 75% of tipping load.)	
205	½ Cu. Yd.	20,000 lbs.	at 10-ft. radius
305	¾ Cu. Yd.	30,000 lbs.	at 12-ft. radius
405	1 Cu. Yd.	40,000 lbs.	at 12-ft. radius
545	(Crane only — 85% rating)	90,000 lbs.	at 12-ft. radius
605	1½ Cu. Yds.	72,300 lbs.	at 12-ft. radius
805	2 Cu. Yds.	104,200 lbs.	at 12-ft. radius
1205	3 Cu. Yds.	190,000 lbs.	at 12-ft. radius

KOEHRING HEAVY DUTY

Extra lift capacity means . . . **MORE WORK CAPACITY WITH ALL ATTACHMENTS**

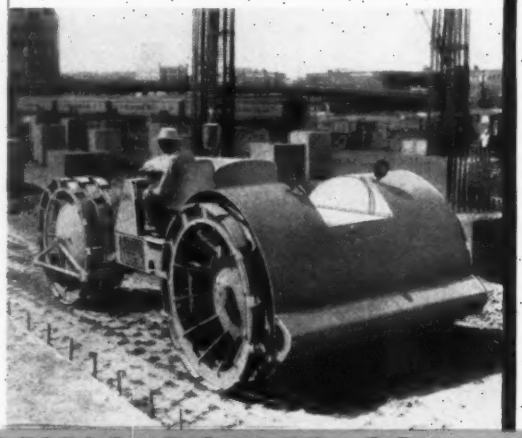
Compacting a 4-foot base for concrete floors



K-45 KOMPACTOR® works among a maze of footings

Close-up compaction was no problem here! Footprints in the clay show how Buffalo-Springfield® K-45 Kompactor®, with its close side clearance and high maneuverability, works flush with footings in congested areas . . . minimizes hand tamping around structures. What's more, the K-45's unique "interrupted pressure" principle of compaction meets required densities in fewest possible passes. Staggered rows of heavy steel "pads" exert *all* compaction effort in a *downward* direction . . . give *uniform* density of fill from lower elevation to top surface . . . in sand, gravel, clay, common earth, etc. Better check what Kompactor can do for *you!* Contact your Buffalo-Springfield distributor today.

JOB HIGHLIGHTS — On sub-grade for this new industrial building, clay base fill had to be compacted to a depth of 4 feet, preparatory to pouring reinforced concrete slab. All work had to be done within a congested 800-ft. x 240-ft. floor area, honeycombed with multiple rows of column footings. Clay fill material was hauled in by trucks from nearby borrow pit, and spread by graders for compacting. Despite lack of "elbow-room", the big, self-propelled Buffalo-Springfield K-45 Kompactor had no difficulty maneuvering between forms . . . worked flush with footings . . . easily met density requirements. Contractor also used this K-45 on similar work for a new airport building . . . and on a highway job where "open-going" permitted full use of its 5-mph operating speeds.



OWNS 5 K-45's — In addition to this K-45, same contractor also owns 4 more Kompactors . . . is operating 2 of them on a major highway contract within his home state . . . and the other 2 Kompactors on another big highway project in an adjoining state.

BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD, OHIO • DIVISION OF KOEHRING COMPANY

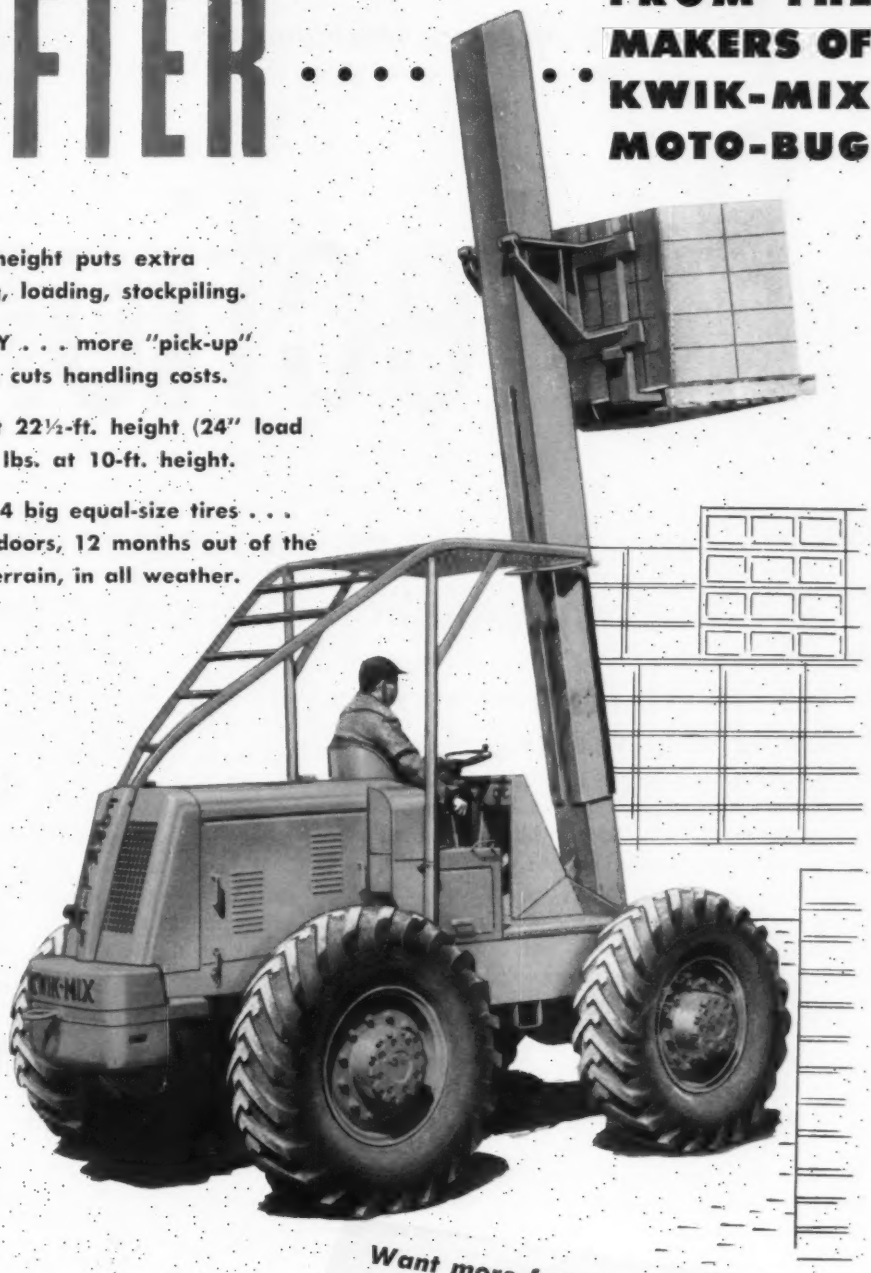
HI-LIFTER . . . . . FROM THE MAKERS OF KWIK-MIX MOTO-BUG

22½-FOOT lifting height puts extra reach into stacking, loading, stockpiling.

BIG LOAD CAPACITY . . . more "pick-up" per lift saves time, cuts handling costs.

LIFTS 4,000 LBS. at 22½-ft. height (24" load center) . . . 6,000 lbs. at 10-ft. height.

4-WHEEL DRIVE on 4 big equal-size tires . . . works indoors, outdoors, 12 months out of the year . . . on any terrain, in all weather.



Other HI-LIFTER highlights:

Box-section single mast telescopes for low headroom.

Better visibility than dual-mast trucks.

Power-tilt mast.

70 h.p. water-cooled gas engine, torque converter.

Smooth power-flow . . . equal speeds forward and reverse . . . no clutching.

Easy power-steering.

18 m.p.h. over-the-road travel speed (with "kick-out" into 2-wheel drive).

3 SIZES — In addition to this heavy-duty "work-anywhere" HI-LIFTER, Kwik-Mix® also builds 2 low-cost Moto-Bug® fork lifts in 1,000 and 1,500-lb. capacities with multi-purpose attachments. All offer time and cost-cutting advantages you can't afford to miss! Call Kwik-Mix distributor or write us today.

Want more facts? Just mail this!

To: KWIK-MIX COMPANY, Port Washington, Wisconsin
Send us: ☐ specs. ☐ price information on HI-LIFTER

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY, STATE_____

CMB KM824

KWIK-MIX
A division of Koehring Co.

MOTO-BUG® MATERIAL-HANDLING EQUIPMENT • FORK LIFT TRUCKS • DANDIE® MIXERS • KA-MO EARTH BORING & DRILLING EQUIPMENT

From Liberty Mutual: a concept of workmen's compensation coverage for today's economic conditions which provides

Protection in

—and how it cuts excess dollars from compensation insurance costs

The business-insurance rates you pay are, in the long run, determined by you

In today's business climate, it's more important than ever for you to keep your expenses down. If you have a large number of accidents, however, or suffer heavy losses over a period of time, you actually contribute to higher insurance rates for yourself. By doing everything you can *right now* to cut down on accidents and eliminate losses, you can help toward lowering your rates *in the future*—and help improve your company's profit picture.

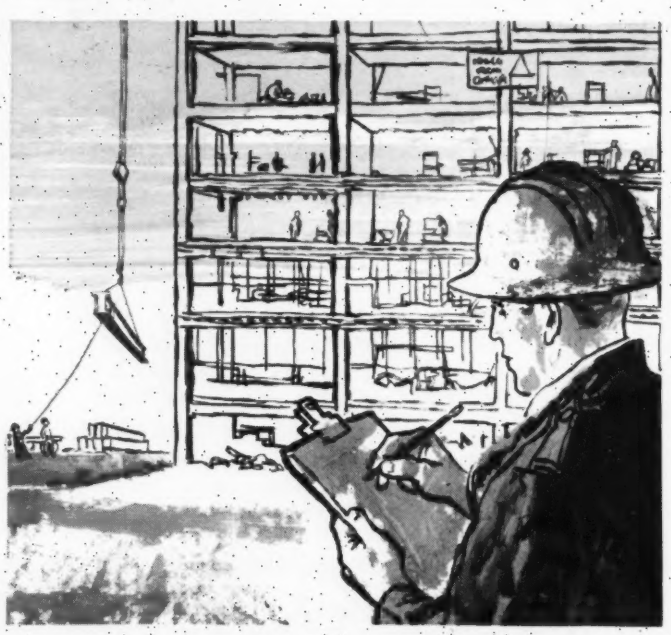
This is why Liberty Mutual—the company with the largest experience in workmen's compensation insurance—has over the years developed a forward-looking concept of business insurance which gives you protection in depth. From the start of your coverage with Liberty, a broad range of skills and resources can be put to work to anticipate and avoid trouble on your jobs and to keep future costs down.

Today, more than ever, *PROTECTION IN DEPTH* can be vital to the growth of your business

With competition so strong in the construction industry, it is apparent that the vigorous, efficiently managed companies will become the industry leaders of tomorrow. The protection in depth you get from Liberty not only helps you trim excess dollars from your insurance costs, but does it without sacrificing any of the coverage you need to safeguard your company during its growth.

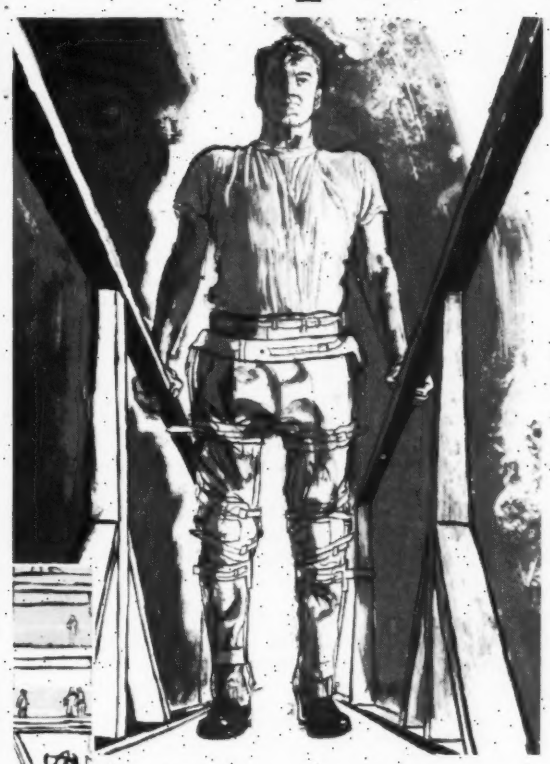
Protection in depth has already helped Liberty establish an impressive cost-cutting record and a record for consistently attracting "blue-chip" accounts. Because we deal directly, our salesmen know their business—and yours. With the vast experience of the company behind them, they can competently handle unusual problems in all fields.

We encourage you to take steps to improve your insurance cost picture by becoming acquainted with protection in depth now. (You should also know about our dividends: since 1912, we have returned more than $455 million to reduce policyholders' insurance costs.)



depth

World-wide trouble shooter. A Liberty engineer goes wherever you have a job. With offices spotted throughout the U.S., fast, experienced help is always nearby. Liberty engineers have provided assistance even as far away as the Philippines and Greenland.



Learning to walk...the second time. The facilities of Liberty's two rehabilitation centers are available to badly injured employees of policyholders. Through therapy and prosthetics, patients help themselves recover, get back on the job.

Keeping danger in check. Liberty's construction engineers conduct advance analysis of your jobs, look for accident hazards and ways to improve operating procedures. Guidance is offered on falsework design, materials handling, traffic plans, etc.

Behind *PROTECTION IN DEPTH* is the broad range of Liberty's special skills and resources

Liberty's special resources are sometimes unique, often broader in scope than most other companies or agencies can offer. Many are routine and offered as a standard part of our work. Others are ready to crack dangerous or money-wasting problems policyholders may have. Here are a few of them and how they can be put to work for you in a program that gives real protection in depth.

An 86-acre, loss-prevention research center. Here chemists, physicists and radiation experts work on extra-tough problems such as: When does worker fatigue begin to affect a man's efficiency? How can the "safe" amount of dynamite be predetermined for blasting in a particular locale?

A medical advisory service. Liberty retains top orthopedic surgeons in key areas to check diagnoses of serious injuries, advise attending physicians.

These Liberty "extras," and the others shown on these pages, all work to give you the best possible protection in depth. All are available to any policyholder who needs them. All of them can work with you to lower insurance costs.

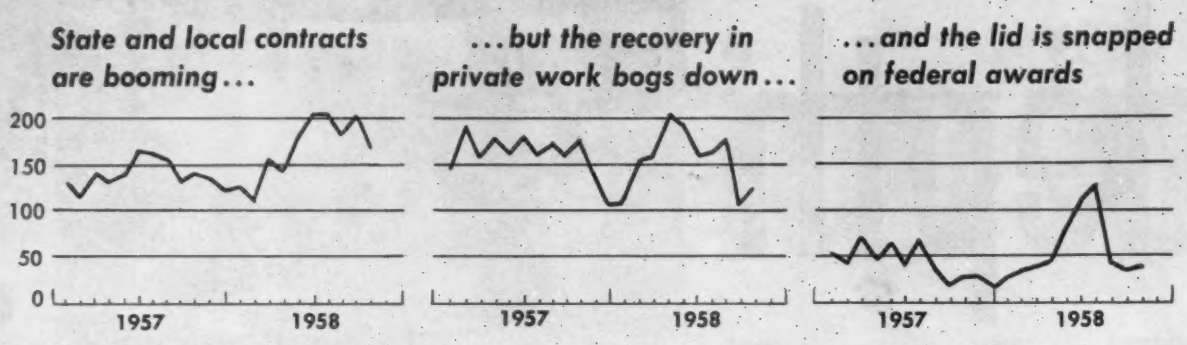
Look for more from

LIBERTY MUTUAL

...the company that stands by you

LIBERTY MUTUAL INSURANCE COMPANY • LIBERTY MUTUAL FIRE INSURANCE COMPANY • Home Office: Boston
Insurance for: Automobiles, Liability, Group Accident and Health, Fire, Workmen's Compensation, Marine, Crime

Heavy Construction Fights to Hold Its Gain



Contract awards reported by CM&E
Weekly average per month in Millions $ per week

Contract Awards Taper Off

HEAVY construction contractors' new business this year is the second largest on record. And while the year will end up second only to 1956's peak volume, there is less to cheer about now than earlier this year when awards were staging the sharpest recovery in history.

Reasons for the "chill": the snappy rebound in private heavy construction bogged down in September and October; and federal contracts are being cut back sharply.

By contrast, state and municipal construction contracts continue to climb. Awards in each of the eight months from March through October topped the corresponding totals a year ago by substantial margins. For the first ten months of this year, state and local contracts are up 16% over last year. And all types of work except waterworks show a gain over 1957.

But as big as it is, the current boom in state and local work cannot fully offset the sharp slide in both private and federal contracts. Private heavy construction fell in September and October to the lowest rate since January. And the 1958 total to date trails 1957 by 8%. Though commercial building and mass housing contracts have netted gains of 8% and 25%, respectively, over volume, industrial building is down 45%, and other private work is off 24%.

Looking Ahead

Though contract awards have lost some of their zip, the potential for future construction awards is bigger than ever. The backlog of heavy construction in the planning stage totals $112.6 billion, according to Construction Methods figures. This is 3% more than a year ago.

The September 30 backlog of all major types of public construction except earthwork-dams-waterways was higher than a year earlier.

continued on page 50

TYPE OF WORK	The Present Contract Awards Total Jan-Sep	% Chg '57-'58	The Future Backlog of Jobs in the Planning Stage Sept 30	% Chg '57-'58
All Heavy Construction	$15,080	+ 7	$112,631	+ 3
By Ownership				
Private	6,125	- 8	48,429	+ 5
Public	8,955	+ 19	64,202	+ 1
State and Municipal	6,572	+ 16	50,128	+ 1
Federal	2,383	+ 26	14,074	+ 1
By Type of Work				
Public				
Waterworks	246	- 6	2,651	+ 12
Sewerage	467	+ 10	3,439	+ 5
Bridges	534	- 2	3,318	+ 2
Highways	2,733	+ 16	12,915	+ 1
Earthwork, dams, waterways	824	- 3	12,007	- 3
Buildings, incl. housing	2,997	+ 34	20,206	+ 1
Unclassified	1,155	+ 33	9,666	+ 1
Private				
Mass housing	2,963	+ 28	21,988	+ 11
Commercial buildings	1,444	+ 8		
Industrial buildings	1,371	- 46	16,501	- 0.1
Bridges	9	+191	83	- 4
Unclassified	338	- 8	9,857	+ 2

CME figures in millions of dollars

Another Caterpillar Improvement That Lowers Maintenance Time and Costs

—NEW DRY-TYPE AIR CLEANERS FOR THE DW20 AND DW21!

The engine's worst enemy, air-borne dust really takes a licking from the new Caterpillar dry-type air cleaner, now standard equipment on DW20 and DW21 Tractors. Another of many earthmover features developed under Caterpillar leadership, this new cleaner not only slashes maintenance time and costs, but also increases engine efficiency and life. For example:

MORE EFFICIENT! New dry-type air cleaner removes 99.8% of all dirt in intake air, where oil-bath cleaners normally remove only 95 to 98%. In addition, effectiveness of the new dry-type unit is *constant* at any engine RPM, is not adversely affected by temperature changes or oil that needs changing.

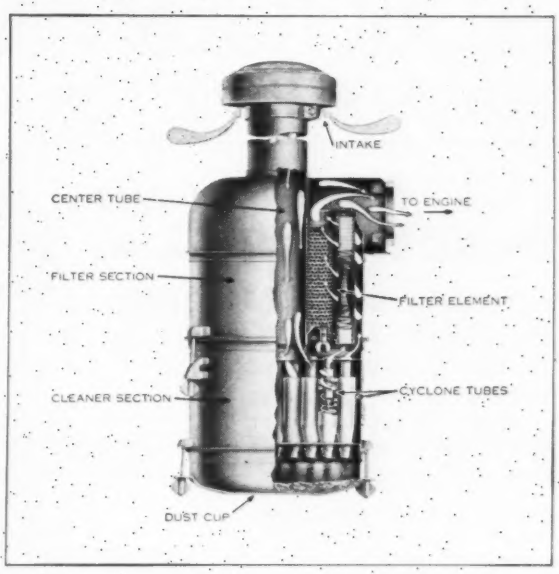
This constant efficiency means that the most serious thing that can happen is reduction of air capacity—and temporary loss of engine power. But dirt *does not* get through into the engine. Excessive black smoke is an immediate visual reminder that HP is decreasing and that the cleaner needs servicing.

EASIER TO SERVICE! Both dry-type and oil-type cleaners should be serviced at intervals depending on dust conditions. But with the dry-type all that's required is removing the pan and emptying the dry material—a matter of 5 minutes, as against 20 minutes it usually takes to service the often messy oil-type. There's 15 minutes *more* for production at each service period!

MORE ECONOMICAL! The paper filter element can be cleaned easily and reused several times making replacement costs lower than the sum normally spent for oil to service the oil-type. Servicing is also faster, reducing labor costs.

Here's proof again that Caterpillar is the leader in *lowering* earthmoving costs. For complete information on the new dry-type air cleaner in Cat DW20 and DW21 Tractors, see your Caterpillar Dealer!

FIND YOUR CATERPILLAR DEALER IN THE YELLOW PAGES



HOW THE DRY-TYPE AIR CLEANER WORKS

Operation of this moisture-proof unit is simple. Air enters it through the stack cap and passes through the center tube. The cap has a 14 x 14 mesh which removes most large, troublesome particles. From the center tube the air passes through the cyclone tubes.

These cyclone tubes swirl the air causing the heavier particles of dirt to drop out by centrifugal action through the funnel section into the dust cup. The relatively clean air then passes to the resin impregnated paper filter. This removes the remainder of the dirt. After passing through it, the air moves to the intake manifold of the engine.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NEW DRY-TYPE AIR CLEANERS FOR GREATER EFFICIENCY AND ECONOMY!

Equipment Rental Rates Rise

Contractors are paying higher rentals for most construction equipment this year than last. However, there are a few decreases in 1958 average rental rates, and some items are unchanged from last year.

These trends show up in the 1958 "Compilation of Rental Rates for Construction Equipment" (Green Book) published by the Associated Equipment Distributors, Chicago, Ill. The changes are based on the rental rate averages computed by AED for informational purposes only.

For major types of equipment, here's how 1958 average rentals compare with last year:

• **Portable compressors** — Gasoline-powered compressors up 2.5% on the average; diesel units about same as last year. A few sizes drop 1% to 2%.

• **Lifting cranes,** crawler-mounter, increase up to 12%; average rise is 5.5%. Truck-mounted diesel-powered, are up 4.5%. Gasoline-powered are down 2% to 5% in middle sizes.

• **Power shovels** show increases in nearly all sizes. Crawler shovels up 3% to 10%; truck-mounted up over 3%.

• **Finishing machines.** Self-propelled, pneumatic-tired bituminous spreading units are up 5%. Crawler-mounted machines are up 1%.

• **Graders,** self - propelled, pneumatic-tired, show a decline. Diesel-powered units are down 1% to 2%; gasoline-powered rental changes range from down 6% to up 5%.

• **Hammers.** Drop piles average gains of more than 10%; steam piles are up 2% to 7%; electric hammers are up 4%; gasoline hammers, up 2%.

• **Buckets.** Clam shells jump 2% to 11%; dragline buckets are up 3.5%; some types of concrete bottom-dump buckets are up 1% to 5%, but other types are down 1% to 4%.

• **Concrete buggies** are up more than 10%.

• **Conveyors.** Large units are up; smaller units show declines or slight increases. Over-all gain is 3%.

• **Front end loaders.** Half show slight drops; others increase from 1% to 5%. Front or rear-drive wheel-mounted units are up an average of 2.5%.

• **Hoists,** gasoline, move down 1% on the average. Smaller, single-drum units are up 9%; larger units are down 1% to 9%.

• **Lighting plants,** gasoline-powered, average 2% higher. Diesel plants decline.

• **Mixers,** portable gas concrete, are up 6.5%; truck mixers (truck not included) move up 6% to 8%.

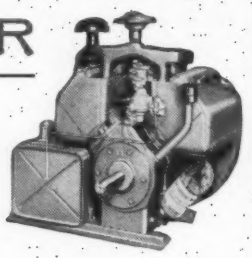
• **Pumps.** Centrifugal and diaphragm liquid pumps are up 1% to 1.5%.

• **Rollers,** pneumatic - tired, self-propelled, increase an average of 1%. Some are up 5%; others are down as much as 4%.

• **Scrapers** show little over-all change. Half increase 1% to 4%; others decline 1% to 7%.

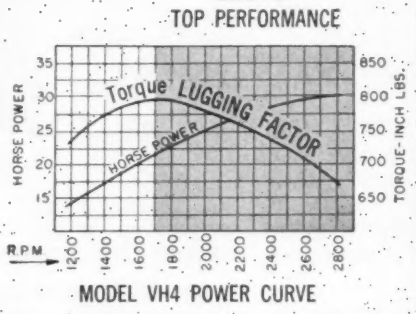
• **Spreaders,** chip types are up nearly 20%; concrete spreaders

30 "HORSES" with a high LUGGING FACTOR



The Model VH4
WISCONSIN *heavy-duty*
Air-Cooled **ENGINE**

It's "heavy-duty" in fact as well as in name. It's built for rugged field service under *your conditions,* no matter how tough they may be.



MODEL VH4 POWER CURVE

One of the outstanding characteristics of this engine is its bulldog LUGGING FACTOR . . . the ability to *hang on* and keep your equipment going under suddenly increased loads that would most likely stall other engines of comparable piston displacement.

With a 107.7 cu. in. piston displacement the V-type 4-cylinder Model VH4D "Wisconsin" delivers 30 hp. at 2800 rpm. with a torque of 675 inch-lbs. Working against peak loads, this engine will keep on slugging away against an rpm. slowdown from 2800 to 1700 rpm., reaching maximum torque at this low speed.

In terms of *power service* to the user, this simply means that your Wisconsin Engine is designed to provide dependable load-holding power *at low engine speeds.* This, in turn, means fewer shutdowns, less wear and tear, more usable power and more versatile performance for your dollar investment.

The high LUGGING FACTOR is one of the basic characteristics that makes Wisconsin Engines worth more . . . one of the reasons why it pays to specify "WISCONSIN" for your equipment.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

OPEN WEB STEEL JOISTS
1959 EDITION
STEEL JOIST APPROVED SJI INSTITUTE
Standard Specifications and Load Tables
THE STEEL JOIST INSTITUTE

SJI publishes NEW steel joist COMBINED SPECIFICATIONS and LOAD TABLES

Combined specifications and load tables for all types of open web steel joists have been published by the Steel Joist Institute, providing a handy reference for the designing architect and engineer. "S" series and "L" series joists uniformly designed are covered in this one over-all standard specification.

While open web steel joists to be manufactured under the new SJI standard will not be available from member companies before January 1, 1959, the combined specifications and load tables have been published at this time to permit incorporation of the new joists into many structures now in the planning stage.

In other new developments, the SJI now offers all SJI-approved "S" series steel joists based upon 20,000 psi working stress, and has increased the number of SJI-approved "S" series steel joist types from 17 to 25.

These improvements by the Steel Joist Institute make SJI-approved "S" series joists a better investment than ever before!

Send coupon for free copy of combined specifications and load tables.

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SUITE 715—DUPONT CIRCLE BLDG. • WASHINGTON 6, D.C.

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STEEL JOIST APPROVED SJI INSTITUTE ©SJI

STEEL JOIST INSTITUTE
Suite 715—DuPont Circle Bldg.,
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Please send me a copy of your new Standard Specifications and Load Tables.

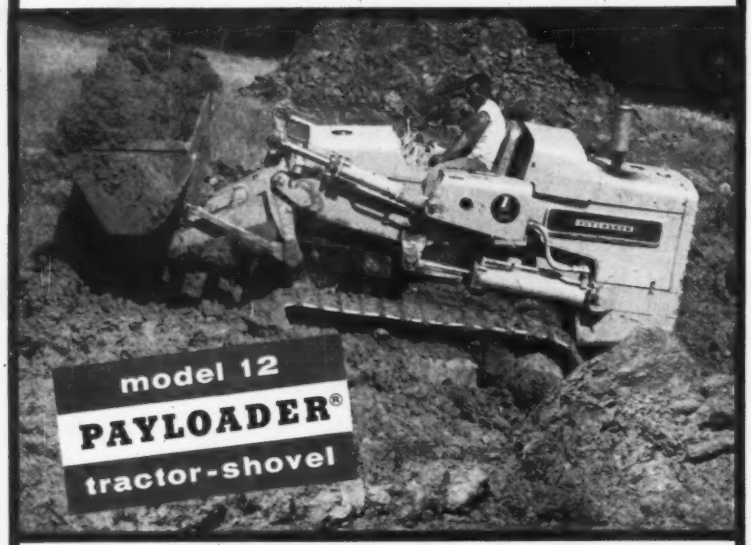
Name_____

Company_____

Address_____

City_____ Zone____ State_____

Users Report on Advantages



Balance: "The Model 12 is balanced so well you can go out of the basement frontwards or backwards with ease" says contractor John Guildenzoph, Manhattan, Ill.

Ease Of Operation: "The Model 12 is much easier on the operator than any machine I ever operated. I can run it all day and still feel good," said Phillip Bruno of Jewett Sand Company, Jonesville, New York.

Visibility: "Awfully nice machine to run. Center seating gives you a smoother ride and you can see what you're doing better than with any other tractor-shovel," says John Drifus, Jr. of the John Drifus Co., Joliet, Illinois.

Speed: "The speed with which it operates can only be appreciated by seeing it work. The torque converter and automatic transmission save precious seconds every time you change direction. We bought the Model 12 to replace a larger machine and since speed and capacity go hand in hand, indications are that we haven't sacrificed either," said contractor John Devins of Westen, Ontario, Canada.

Production: "I can heap load a 10 yd. truck from a stockpile in 1 minute," says contractor John Beninger of Sheboygan, Wis.

If you are still using conventional tractor-shovels, find out how much more this remarkable new "PAYLOADER" can do for you. Return the coupon for complete details today or ask for a demonstration on your job. The Frank G. Hough Co., Libertyville, Ill.

Send 8-page bulletin and other data in the 1¾ cu. yd. Model 12 "PAYLOADER" tractor-shovel to:

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Title.....
Company.....
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City..... State.....
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THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

CONSTRUCTION BUSINESS . . . continued

are up 8%; self-propelled stone spreaders are up 1.5%.

- **Tractors,** crawler diesels rise 1.5%. Two-wheel tractors with two-wheel scrapers average no change; but four-wheel tractors with two-wheel scrapers drop 5%. Four-wheel tractors with four - wheel scrapers increase slightly.
- **Trenchers,** ladder or vertical-boom and wheel-type diesels are up 3%; gasoline ladder or vertical-boom types are down 8%, and wheel-types down 1%.
- **Vibrators.** Smaller sizes of flexible shaft, electric-powered machines climb 7% to 10%; rates for larger units are steady. Motor-in-head types of electric vibrators are up 5% to 6%. Gas-powered, flexible - shaft units show little change.

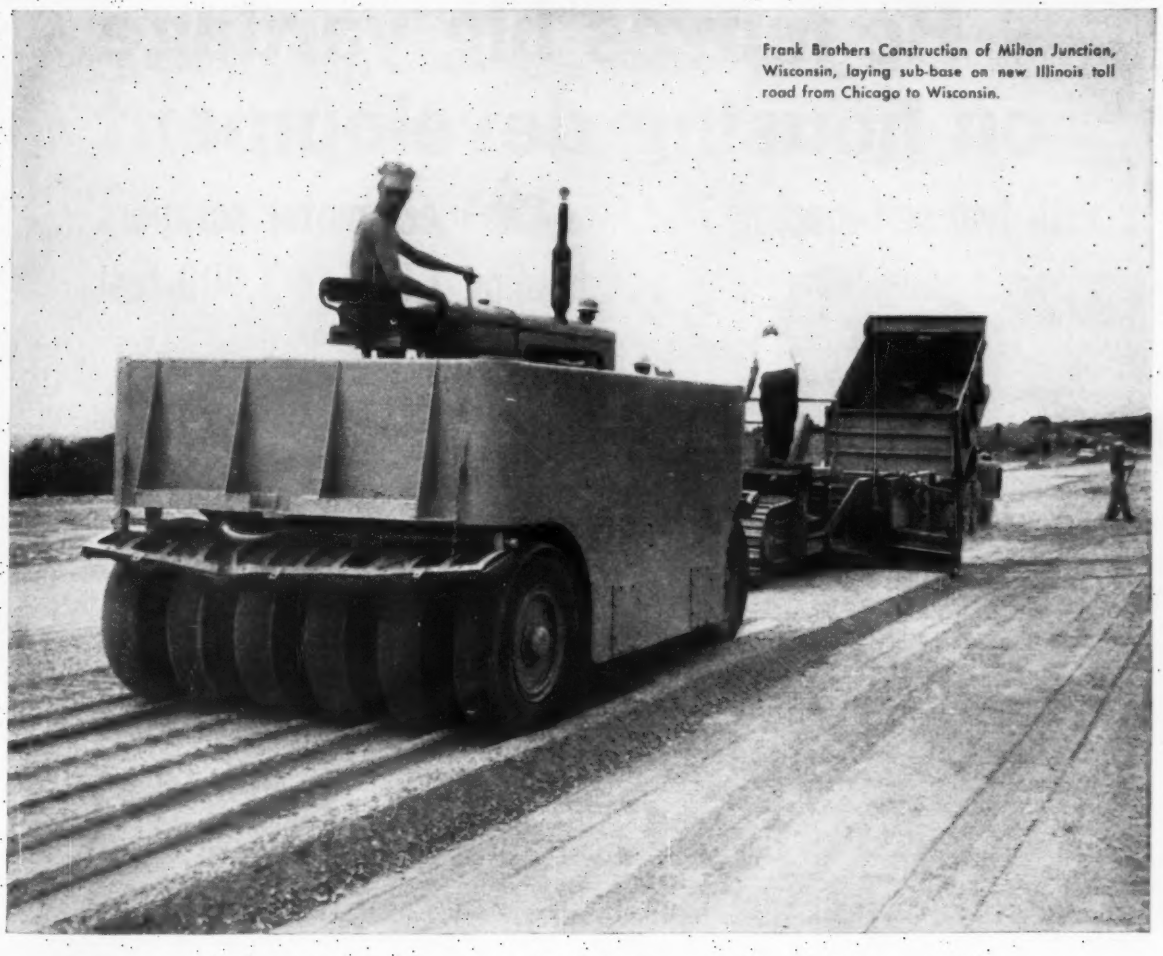
The 84-page Green Book is available at $5.00 per copy from the AED, 30 East Cedar Street, Chicago 11, Ill.

SOME BIG CONTRACT AWARDS OF THE MONTH

Tidewater Construction Co., 538 Front St., Norfolk, Va., **George F. Hazelwood Co.,** North Branch, Cumberland, Md., **Peter Kiewit Sons Co.,** 1024 Omaha National Bank Bldg., Omaha, Neb., and **Patterson, Emerson & Comstock, Inc.,** 313 E. Carson, Pittsburgh, Pa. Construct U. S. Naval Radio Observatory, Sugar Grove, W. Va., Fifth Naval Dist., Dpt. Navy, Norfolk, Va. $60,000,000.

Cauldwell-Wingate Co., 120 E. 41 St., New York 17, N. Y. 53-story office "277 Park Ave." Park, Lexington Aves., 47 and 48 Sts., New York, N. Y. for Stahl Equities Corp., 1657 Broadway, New York, N. Y. $45,000,000.

Arundel Corp., 501 St. Paul Pl., Baltimore, Md., **L. E. Dixon Co.,** 409 S. California St., San Gabriel, Calif. and **Hunkin-Conkey Constr. Co.,** 1740 E. 12, Cleveland, Ohio. Tuscarora Power Plant, Niagara County, N. Y. for the Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. $39,834,292.



Frank Brothers Construction of Milton Junction, Wisconsin, laying sub-base on new Illinois toll road from Chicago to Wisconsin.

New toll road takes small toll on equipment

thanks to Cities Service lubricants!

Laying sub-base for a 15-mile stretch of the new Illinois toll road is no easy task . . . especially when there's a 140,000-yard rock cut to be removed.

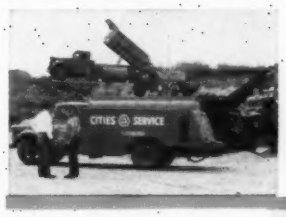
Rock or no rock, Frank Brothers must get the job done on time or they'd idle the paving contractors working the stretch directly behind them.

To do this, Frank Brothers' crushing plant and its many earthmovers and graders must operate without breakdown—without headache. **And they do just that, thanks to Cities Service C-500 Motor Oil and other fine Cities Service products.**

Recommended for Caterpillar diesel engines operating under the most severe service, Cities Service C-500 Motor Oil has the highest level of detergency-dispersion . . . a good reason why Frank Brothers' equipment stays on the job, hour after grueling hour.

"Not only is our Cities Service lubrication flawless, but we get the best possible field service wherever we go," says Phillip Frank.

If you're not getting just that from your supplier, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.



"Wherever We Go, Cities Service provides excellent on-the-spot service to keep things running smoothly," says Phillip Frank. Portable crushing plant here produces 2,300 cu. yds. of sub-base per day.

With No Time To Waste, Frank Brothers' equipment must operate constantly without breakdown. "We do it with Cities Service Gasolene, Diesel Fuel and C-500 Motor Oil," says Mr. Frank.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

He moves big yardage on housing development

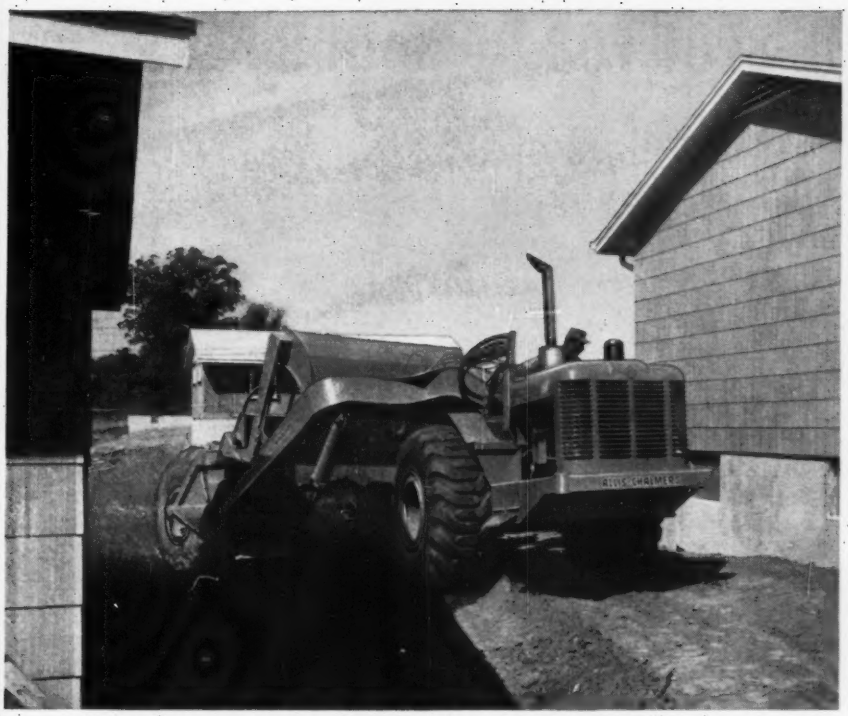
with two self-loading 7-yd Allis-Chalmers motor scrapers . . . hauling 1,500 to 3,000 feet

K. L. Perry
K. L. Perry Excavating Co.

On a new development location for a big residential subdivision, K. L. Perry Excavating Company of Kansas City, Missouri, has found a new and profitable earth-moving team—two Allis-Chalmers TS-160 motor scrapers. Perry bought them on the basis of a demonstration which proved their maneuverability, speed and ability to self-load. Now the TS-160's have sold him on dependability and economy, too.

One of Perry's self-loaded TS-160's leaves the cut as the other returns to keep up the 1,000-yard-a-day pace on Vineyard Woods job.

Look ahead... *move ahead*...and stay ahead with



Short turning radius (less than 25 ft) and positive hydraulic control make maneuvering through tight spots a simple operation for Perry's TS-160's.

The TS-160 is the only motor scraper near its size available with forced ejection and extra high apron lift that assures easy ejection of toughest material.

TS-160's move dirt faster... cut operating costs in half

Earth-moving operations in modern housing developments have to move fast to keep costs low . . . and to set the pace for production line methods in home construction. On the Vineyard Woods job, for instance, to maintain the building program, Perry had to average 500 cubic yards per day, hauling up to 3,000 feet.

His two Allis-Chalmers TS-160 motor scrapers handled it with plenty to spare. Self-loading, they frequently topped 1,000-yard production daily. At the same time, operating costs were cut in half compared to his previous equipment. Perry says his Allis-Chalmers motor scrapers are big producers . . . helped him finish contracts days ahead of schedule. He now bids and makes a profit on contracts he couldn't consider before.

Self-loading, compactness and maneuverability make TS-160's naturals for development work

Primary factors in Perry's choice of Allis-Chalmers TS-160's were their demonstrated high-speed and self-loading ability. However, since he's had them, other benefits have become apparent. Perry is particularly pleased with their maneuverability. They turn in less than 25 feet—a valuable timesaver in limited space on many housing development operations. Hydraulic power steering makes maneuvering in tight quarters easy and efficient.

They also save time and money between jobs . . . move on highway at up to 25.4 mph. Operator comfort and ease of handling were noted as outstanding by Perry and his crew.

Performance sold the machines... dependability proved their value

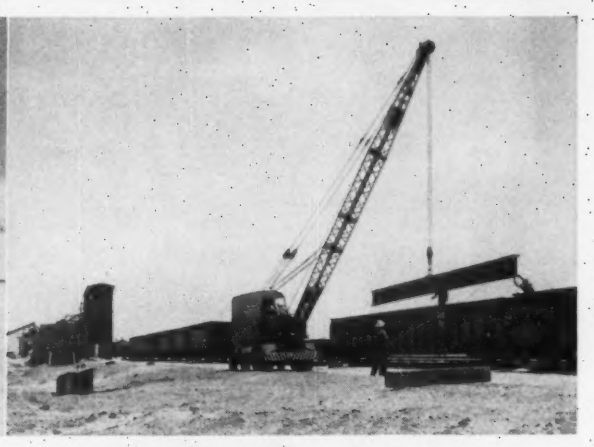
K. L. Perry checked them all when he was in the market for high-speed dirt-moving equipment. He says, "We were sold by demonstration that the Allis-Chalmers machines were best—but the real proof came with performance like we had on the Vineyard Woods development in Kansas City. We've had only routine maintenance on the machines in eight months since we bought them. They put us in position to get the 500-home Kentucky Hill job at Independence, Missouri."

This TS-160 motor scraper story is a good example of the value in talking things over with your Allis-Chalmers construction machinery dealer. He knows the earth-moving business and can help you choose the machines that will help you most. Ask him for a demonstration right on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

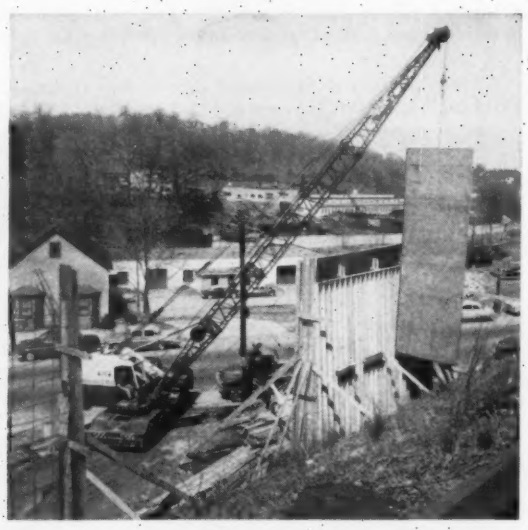
JOHNNY-ON-THE-SPOT FOR ROAD BUILDERS

MASSACHUSETTS 22-B Transit Dragline digs out the soft spots and furnishes leach on the Massachusetts Turnpike. Owned by Henley-Lundgren Co., Shrewsbury, Mass., this machine is equipped with 60-ft. boom and ¾-yd. bucket. Rig is steady, even with boom reaching far out.



NEW MEXICO 15-B Transit Crane unloads beams at a railroad siding near Albuquerque. Moving fast for hit-and-run assignments like this, the 15-tonner will also do unloading at bridge site. Rig is owned by J. H. Ryan & Son, Inc., Albuquerque.

OREGON 22-B Transit Crane, owned by Guy F. Atkinson Co., San Francisco, Calif., moves forms on concrete pier for new interstate bridge over the Columbia River. Machine is equipped with 60-ft. boom and 20-ft. jib. Operator view to all quarters on this job is essential to safety of men working at the site.



NEW YORK As part of a $16-million road relocation program in greater New York City, this 22-B sets forms for overpass abutments in rerouting of Saw Mill River Parkway. Machine is owned by Ottaviano Const. Corp. Operator commented, "You have an easy view of the whole work area in this rig."

These contractors are profiting from Bucyrus-Erie cranes and excavators that switch quickly and *easily* from one front end to another, handle so many different phases of each contract. To find out why Bucyrus-Eries are *worth so much more from start to finish of every job,* see your nearby Bucyrus-Erie distributor, or write direct to Bucyrus-Erie Company, South Milwaukee, Wisconsin.

477E58

A Familiar Sign . . . BUCYRUS ERIE ***. . . at Scenes of Progress***

FRAM FILTERS *cut our down-time in half!*

"They're really doing a good job," reports Victor Holzinger, Master Mechanic of The Gaskill Construction Co. of Riverton, N. J.

"We used to put about 3000 hours on our six earth movers before they were pulled into the shop for an engine overhaul. Now, since we installed FRAM Air Filters, about a year ago, we're logging over 6000 hours. What's more, we've been able to chop about half an hour off our daily maintenance, too. We're very well satisfied with FRAM Air Filters . . . and are equipping all of our off-the-highway vehicles with FRAM Filters."

Wherever the going is rough, tough and dirty . . . FRAM Oil and Air Filters fill the bill. Engines work longer and harder, need less maintenance and fewer overhauls when you protect them with FRAM Filters.

FREE SURVEY! If you would like a FRAM Field Engineer to survey your fleet, use this coupon.

FRAM Corporation
Fleet Sales Division
Providence 16, Rhode Island.

Please have representative call and give complete details on Free FRAM Fleet Filter Survey.

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crank engines lightning fast—

with OIL!

- **Sure, split-second starting—even in sub-zero weather**
- **Cranking power always available—even after months of idleness**
- **Safe: spark and explosion proof. Light in weight**
- **Low cost: saves battery, down-time and maintenance expense**

Here's a proved cranking system that spins engines 2 to 3 times faster—in torrid heat or freezing cold. It's the American Bosch HYDROTOR — the hydraulic cranking system that puts real muscle into engine cranking — eliminates battery and starter troubles, reduces down-time expense — saves you real money on maintenance and repairs.

You'll want to learn more about HYDROTOR—the revolutionary system that uses oil under high pressure to crank diesel or gasoline engines *faster with greater power*. You'll want the outstanding performance and dependability—the economy of HYDROTOR for your engines. Send today for free brochure H110-02-2 and the name of your nearest Hydrotor distributor. American Bosch Division, American Bosch Arma Corporation, Springfield, Mass.

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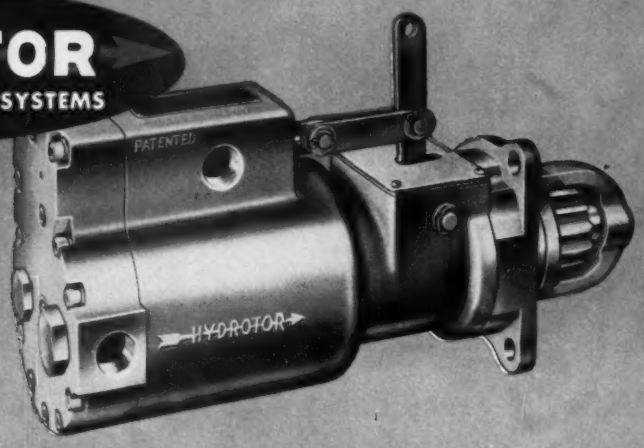
HYDRAULIC CRANKING SYSTEMS



HYDROTOR ....

proved best by far for performance, for dependability, for low over-all cost.

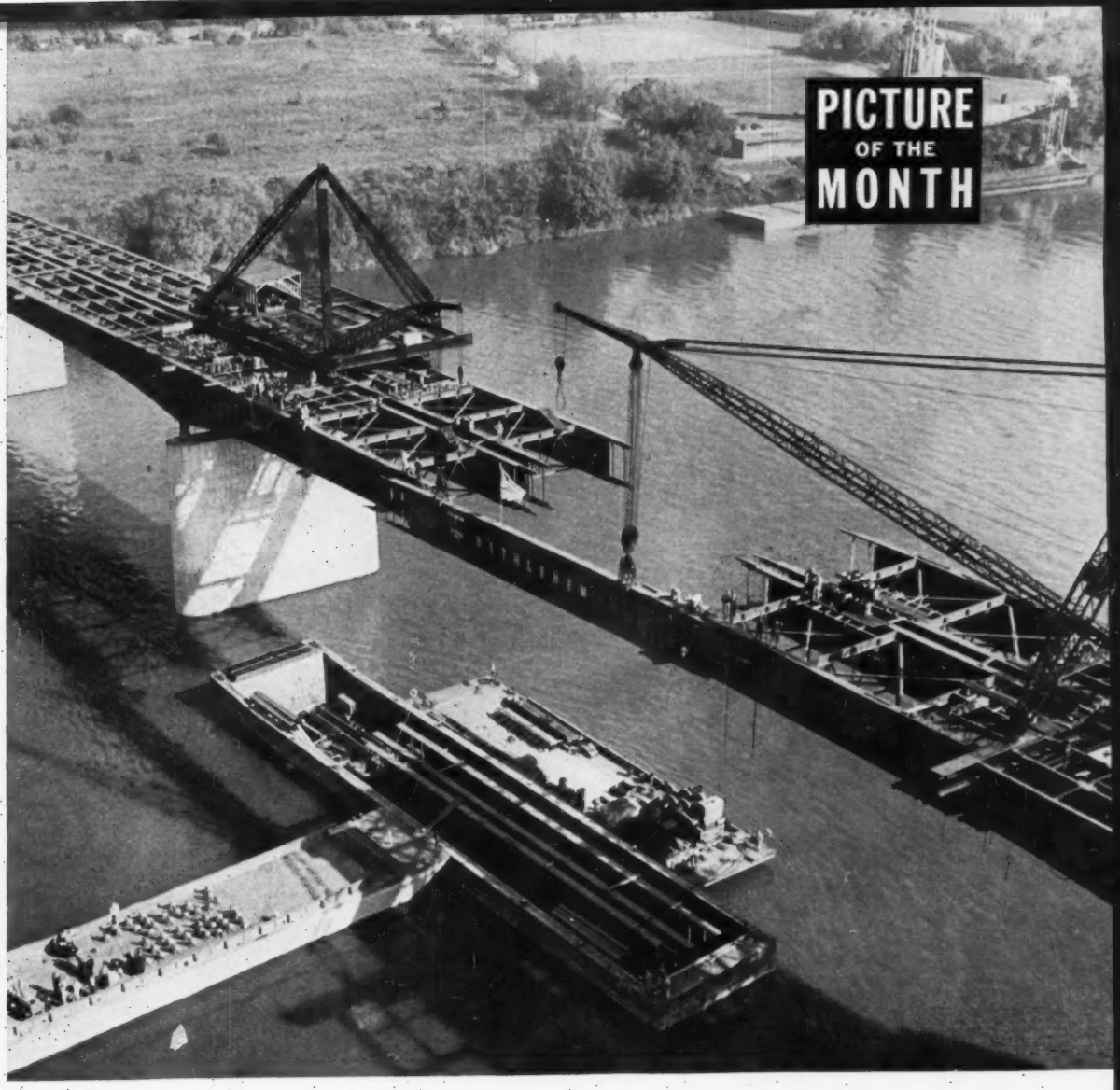
FOR CONSTRUCTION

FOR TRUCKING

FOR MARINE USE

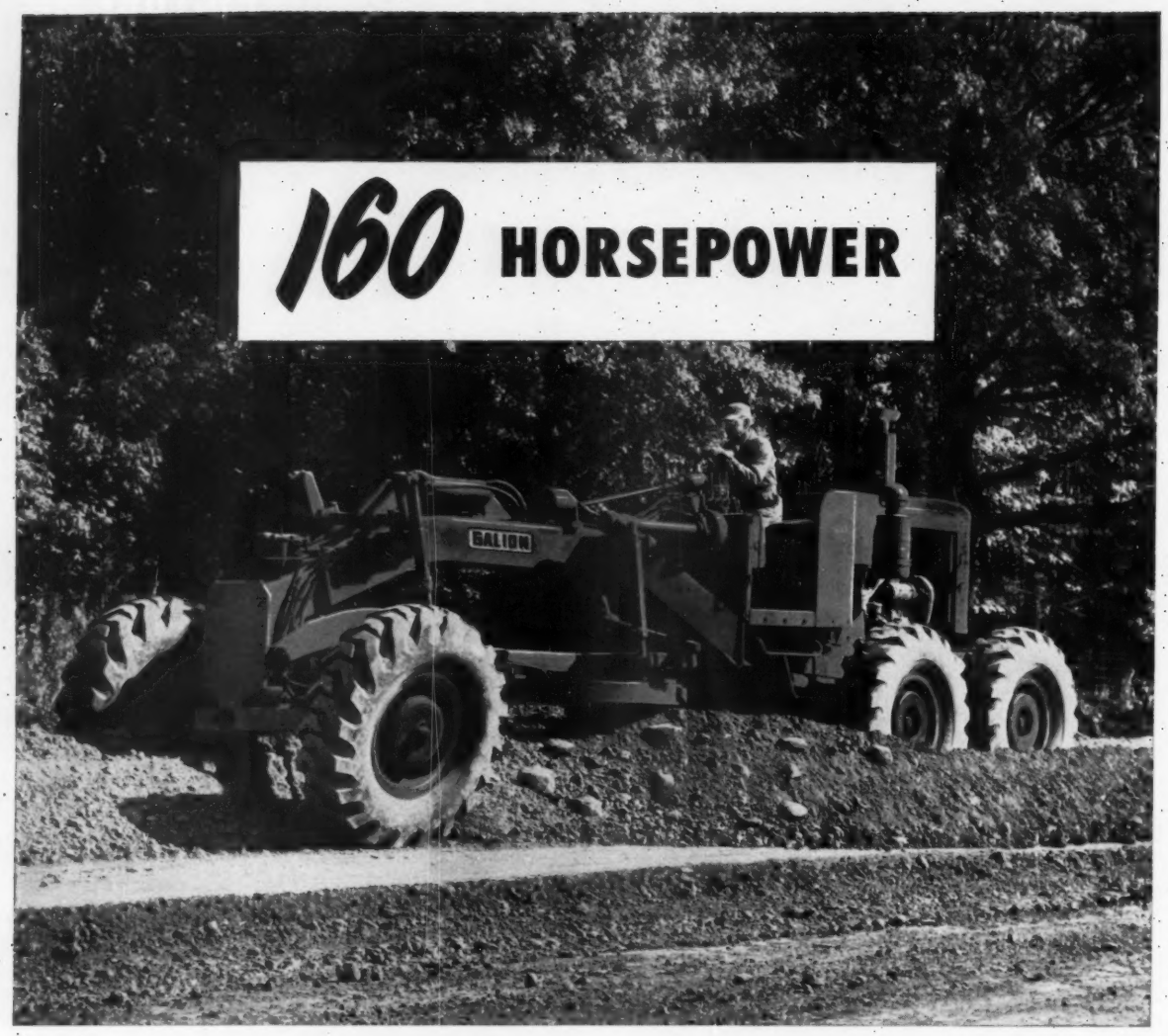
FOR OIL FIELDS

AMERICAN BOSCH ARMA CORPORATION



Journey's End For Last Girder

• Flying the traditional flag, the last of 124 girders for the Canal St. bridge across the Tennessee River is positioned by two 115-ton stiff-leg derricks. The girders were floated down inland waterways to Chattanooga from the Bethlehem works at Rankin, Penn. Fifteen simple and continuous spans tie together to form the 2,641-ft long, 72-ft high bridge. The use of high-strength, medium-manganese steel reduced steel requirements for the bridge to 6,572 tons. The 925-ft long continuous plate girder span crossing the channel weighs 3,193 tons. It consists of a 375-ft center section and two 275-ft side sections. The finished bridge will carry two 26-ft wide concrete roadways. Girders vary in length from 55 to 137½ ft.



GALION MODEL 160

Six-speed, constant-mesh transmission.
Hydraulic Shiftable Moldboard 13'x29"x¾".

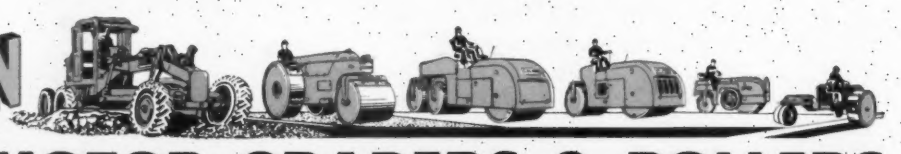
Weight . . . 30,020 lbs.

Available with creeper transmission and Hydra-Tilt moldboard.

Write for Bulletin 421.

THE GALION IRON WORKS & MFG. CO.
General and Export Offices—Galion, Ohio, U.S.A.

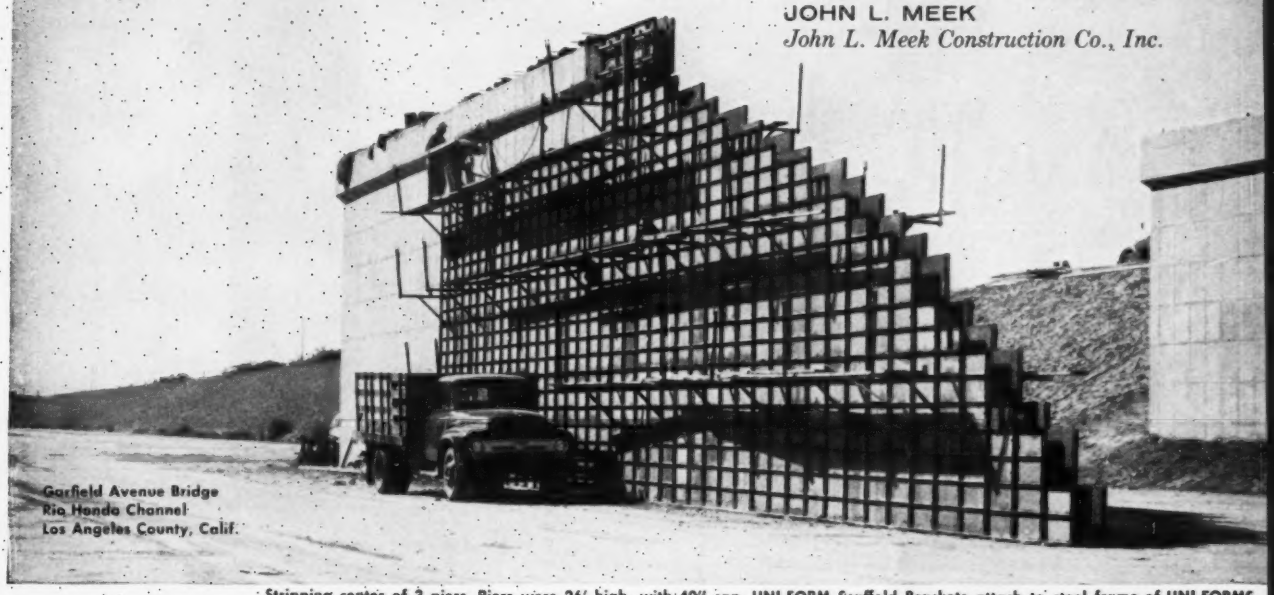
GALION
ESTABLISHED 1907



MOTOR GRADERS & ROLLERS

"my men were UNI-FORM **EXPERTS** *an hour after they began using them"*

JOHN L. MEEK
John L. Meek Construction Co., Inc.



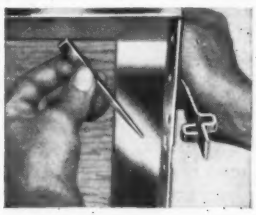
Garfield Avenue Bridge
Rio Hondo Channel
Los Angeles County, Calif.

Stripping center of 3 piers. Piers were 26' high, with 40" cap. UNI-FORM Scaffold Brackets attach to steel frame of UNI-FORMS.

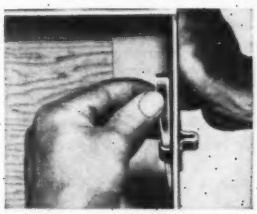
When inexperienced crews—men who have never used them before—can become expert in the handling and erection of UNI-FORM Panels in an hour or two, it means big savings in time and labor . . . faster job progress and lower all around costs. Simple mechanical assembly of UNI-FORM Panels permits fewer men to form more contact area per hour than is possible with any other job-erected forming system. The John L. Meek Construction Company's experience with UNI-FORM Panels is typical—quick mastery of the simple UNI-FORMING technique, resulting in faster forming with less labor. A good reason why more concrete is being formed every day with UNI-FORM Panels . . . why more contractors are using the UNI-FORM System for all their forming, regardless of type and size of the job. Write for the UNI-FORM Catalog—illustrates and describes the complete UNI-FORM System.

Pier and wing wall is 122' long. Tapered wing walls cut flow pressure.

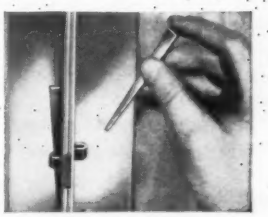
UNI-FORM ASSEMBLY IS SIMPLE AS THIS:



1. UNI-FORM Tie Loop is placed into the square tie hole of Panel.



2. Tie Key is set into the Tie loop. This locks tie and Panel into 1 unit.



3. Bring next UNI-FORM Panel into position. Insert Tie Key in other Tie loop. Assembly is completed.

UNIVERSAL FORM CLAMP CO.

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CONCRETE FORM SPECIALISTS SINCE 1912

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ATLANTA, GEORGIA 1401 Howell Mill Rd., N.W.

Universal Form Clamp Co. of Canada, Ltd., 226 Norseman St., Toronto, Ontario

These are tarry deposits removed from crankcase into which permanent-type anti-freeze had leaked.

What some fleet men say is their most serious and repeated engine problem

Permanent-type anti-freeze leakage into crankcase a cause of major maintenance headaches

By A. C. Davis and J. M. Miller, Sales Technical Service Department
Standard Oil Company

Both gasoline and diesel engines frequently suffer leakage which permits permanent-type anti-freeze to seep into the crankcase. When this happens, deposits form. Deposits vary from light, varnish-like films to heavy, black, rubber-like tar. The harmful effects of light varnish deposits can range from nil to plugging of rings, sticking of hydraulic lifters and valves and, possibly, sticking of pistons. In severe cases, heavy, black, rubber-like deposits tend to accumulate in the crankcase. Equally serious is the fact that the anti-freeze may remove the additives from the motor oil, causing them to settle out. Deposits resulting from permanent-type anti-freeze leakage are unwanted, and additive removal robs the engine of the full protective qualities of the motor oil and additives.

Identifying problem is difficult

One reason for the seriousness of the leakage problem is that it can go unrecognized until too late. The varnish-like deposits are similar in appearance to those due to lack of motor oil quality or to lack of additive in the motor oil. This is the type most frequently encountered. The deposits, due to heat and chemical action, bear no resemblance to the original anti-freeze and are difficult to analyze.

In general, anti-freeze contamination of motor oil goes unrecognized because permanent anti-freeze solutions are insoluble in oil. They settle to the bottom of the crankcase and usually are not included in a used oil sample. Extreme care in sampling is necessary to detect this contamination.

When heavy, tarry deposits occur and motor oil additives are mixed with the deposits, the deposits tend to stay in the crankcase. Frequently, on draining, the oil appears relatively clean—that is, it is less contaminated with carbon, soot and other oil-coloring materials. If such deposits are suspected, they may still be missed by probing because they do not readily adhere to the probe.

These factors can lead a skilled and competent maintenance crew, and an equally capable laboratory analyst, into believing there is no sludge in the crankcase or that there is no oil varnish due to contamination. If the crankcase is removed, however, the damage-causing, tarry-like deposits will be found.

Stop anti-freeze leakage to prevent deposits from occurring

Check head gasket for possible leakage. If leakage is occurring there, gasket should be replaced. In engines using "wet sleeve" type cylinder liners, the sealing rings and lands should be inspected for leakage. Where a synthetic rubber-based sealing compound is used over the sealing rings and lands, replace this coating whenever engine is disassembled.

STANOLUBE Motor Oil with permanent-type anti-freeze. Note how the oil is holding anti-freeze in suspension. Clear liquid at bottom is water from anti-freeze.

Wooden stick plunged into tarry substance comes out nearly clean. Being more cohesive than adhesive, tarry material does not readily stick to surface. Without careful visual inspection, impression can be gained that engine is clean.

Motor oil in which permanent-type anti-freeze has been introduced. Note how additives in oil have settled out and formed into mass at bottom. They can no longer protect engine parts.

In a laboratory bench test ordinary motor oil that has been contaminated with permanent-type anti-freeze and heated as in an engine. Oil has become solid and will not pour.

Anti-freeze affects different motor oils in various ways

The amount and nature of deposits is affected by the amount of anti-freeze leakage and the composition of the motor oil. Severity of operation is also a factor in the amount of deposits formed.

STANOLUBE HD-M and S-1 Motor Oils have demonstrated a unique ability to hold anti-freeze in suspension, minimizing deposits. Most important, the additives in STANOLUBE HD-M and S-1 are not readily removed by the anti-freeze.

Service suggestions

If used oil at drain time appears cleaner than expected, it should make one suspicious of the loss of additive. A mildly opaque oil often signals that water is present, but that additives remain in the oil. We know of no better method of protecting engines in winter than by the use of permanent-type anti-freeze. However, the possibility of leakage and the resulting damage to engine and oil that may occur, are good reasons for removing anti-freeze during warm weather.

More facts

Get more facts about permanent-type anti-freeze contamination and about how STANOLUBE Motor Oils can help solve this problem. Inquire of your Standard Oil automotive lubrication specialist at any of the 48 district offices in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

How to clean an engine contaminated by tarry deposits resulting from permanent-type anti-freeze leakage

1. Drain out all oil and remove oil filter; fill the crankcase with a mixture of about 3 qts. of SAE 10 W and 2 qts. of Butyl Cellosolve (obtainable from chemical suppliers); idle the engine for 30 minutes, noting the oil pressure; immediately drain the solution from the crankcase.
2. Add a flushing solution of about 3 qts. of SAE 10 W and 2 qts. of Kerosene; circulate the mixture at idling speed for 5 minutes; completely drain the system.
3. Install a new oil filter element and add fresh oil of the grade and classification required.

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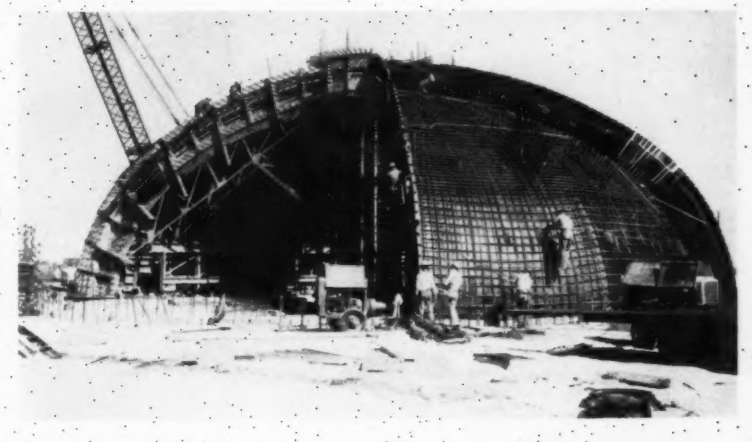
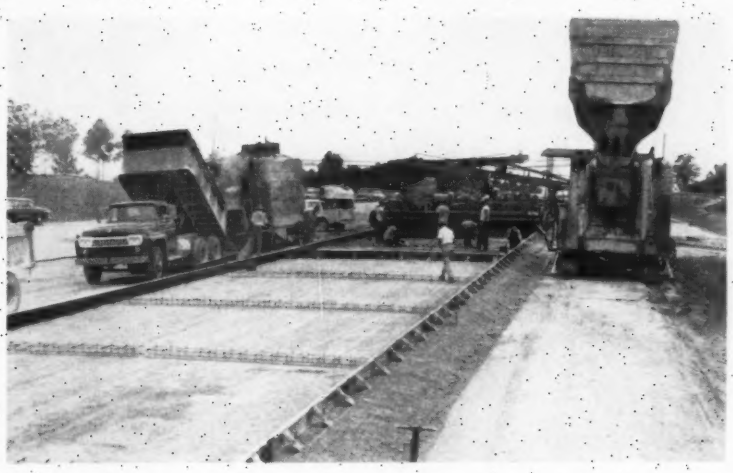
Construction News in Pictures . . .

Rotating Forms

Curved steel form for this blast proof concrete control room at the Air Force Missile Test Center, Cape Canaveral, Fla., rolls around inside the structure on rubber wheels. Form, designed by Blaw-Knox, is jacked up while pie-shaped section of 5 to 6½-ft thick roof slab is poured. Jacked down onto wheels, form pivots to next section.





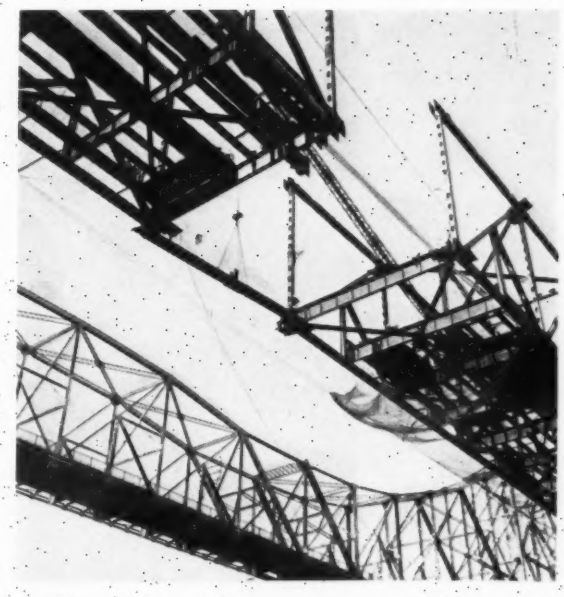
Alabama Gets Started

Crews put down the first paving for Alabama's 900-mi share of the new Interstate Highway network. Job is an 8-mi stretch that parallels U. S. Route 31, 20 mi north of Birmingham. Prime contractor on this section is A. E. Burgess Company of Birmingham. Paving contractor is W. L. Coston & Sons, also of Birmingham.

Connecting Link

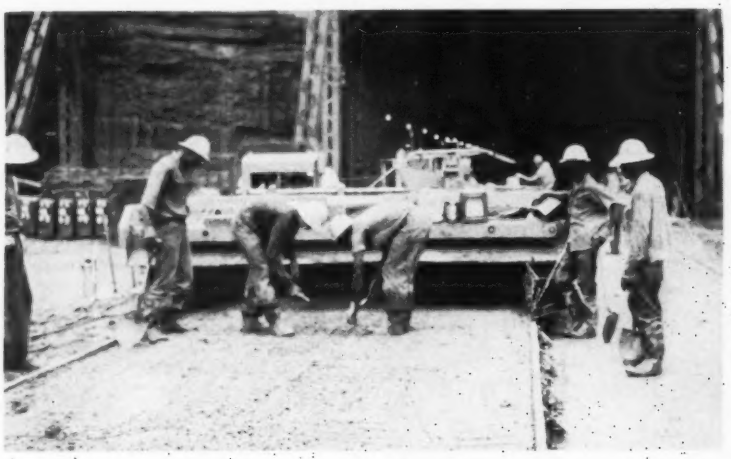
Crews of the U. S. Steel Corp.'s American Bridge Division hoist into place the 62-ft girder closing the last gap in the Carquinez Straits Bridge across San Francisco Bay. The 12-ton link flies the traditional Stars and Stripes as derricks lift it up to bridge from barges on the water 150 ft below. Bridge will be finished later this year.

continued on next page



Airborne Loader

To help raze a 60-yr old building in downtown Minneapolis, Minn., a small front-end loader, weighing 5,000 lb, is hoisted to the seventh floor by a Lorain Moto-Crane. The loader dumps debris down a special shaft. The foreman reports that the ½-yd Moto-Loader does more work in two hours than a 10-man crew can do in a day.



Tunnel Paving

Workers fasten together sheets of welded wire fabric reinforcement for roadway of the northbound tube of the Fort Pitt Tunnel in Pittsburgh, Pa. Behind the crew a Blaw-Knox paver levels off a 2-in. lift of concrete. Merritt-Chapman & Scott Corp., the general contractor averages 700 ft of pavement per day.

Heavy Drilling

A pair of Gardner-Denver Air-Tracs perch on top of massive granite boulders to drill blast holes for the Mammoth Pool Dam on the San Joaquin River in Central California. The Southern California Edison Co. is building the 4,000,000-cu yd earthfill dam to generate 126,000 kw of power. Bechtel Corp. is the prime contractor.

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There's no mess, no spilling, no waste in filling your grease guns—when you use the new Sinclair LITHOLINE Multi-Purpose Grease Cartridge. Takes only seconds to pop a cartridge into the gun—and you're ready to lubricate. Fits all regular cartridge type guns.

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3. **TOUGH, HIGH DIELECTRIC INSULATION**—Leg wires of Hercules caps are coated with plastic insulation for outstanding toughness, resistance to abrasion, superior dielectric qualities.

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5. **WATERTIGHT WATERPROOFING**—A special Hercules waterproofing formulation minimizes the possibility of moisture or dampness penetration.

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XR56-1

News about Allis-Chalmers construction machinery . . .

Tractor power helps build Navajo Dam...40 stories high

Morrison-Knudsen Co., Inc. is sponsoring contractor on the Navajo Dam job in a joint venture with Henry J. Kaiser Co. and F & S Contracting Co.

Right now, the dam you see here exists only in the minds of its builders. Spanning a sun-baked canyon in New Mexico, it will create a lake 37 miles long . . . enough water to irrigate many thousands of thirsty acres. But towering Navajo Dam, one of the world's largest earth-fill structures, will take four more years to complete. Sponsoring contractor is world-famous Morrison-Knudsen . . . already moving the first of 26 million yards of dirt and rock that will test tractor performance and dependability as severely as any job can. M-K's choice — big Allis-Chalmers crawlers with turbocharged diesel power, hydraulic torque converter drive, and the toughest track ever made. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

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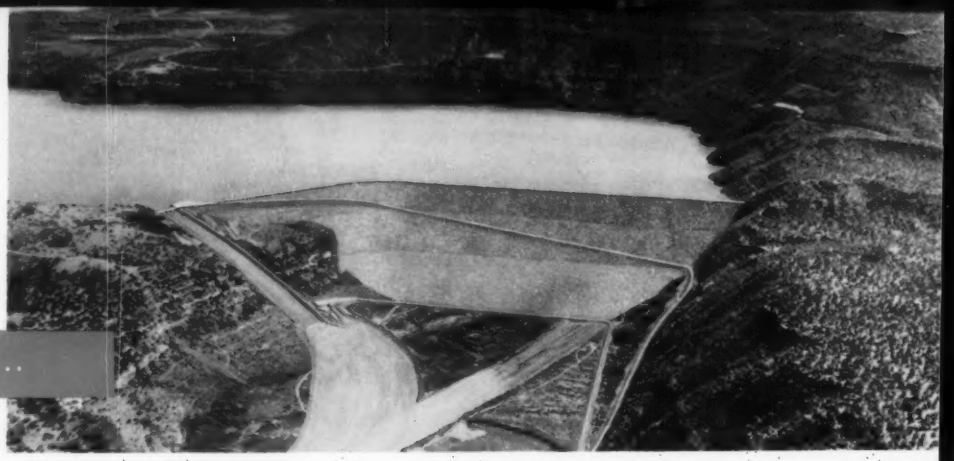
POWER FOR A GROWING WORLD

OVER



How it will look—The finished dam will be 3800 feet wide, 3200 feet thick at its base . . . and will create the biggest body of water in New Mexico.

picture report.....

Allis-Chalmers big HD-21's get Navajo Dam under way

24-foot-wide dozing team—Torque converter HD-21's match power and speed precisely, as they work together to push huge mounds of dirt and rock over the cliff to prepare for construction of a spillway.

No worries about river work—Positive-seal protection of vital track parts lets the HD-21's doze rock from the river bottom to form approaches for a temporary bridge without fear of lubricant loss or track damage.

Heavy-duty power for heavy-duty haul roads—Big Allis-Chalmers Forty Five motor graders fit the Navajo job to a "T." Clean, uncluttered design lets operator see both ends of the moldboard easily as he cuts a roadside ditch.

Four plus yards at a crack—This Allis-Chalmers HD-21G, biggest tractor shovel available anywhere, is helping to load about 40,000 yards of rock and dirt to clear the way for construction of a diversion tunnel.

See for yourself why Allis-Chalmers equipment was chosen for the Navajo Dam job. Your Allis-Chalmers dealer will demonstrate machines to fit your requirements . . . on your job—no obligation. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin

ALLIS-CHALMERS ***POWER*** **FOR A GROWING WORLD**

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MS-1317

Litho in U.S.A.

Makes 230′ lifts using new tubular frame boom

WHIPPING, LAGS AND BACKLASH ELIMINATED...MORE LIVE LOAD CAPACITY—LESS DEADWEIGHT

A new type of crane boom — mounted on a Manitowoc 60-ton Model 3900 crane — is doing a spectacular job for the John F. Beasley Construction Company, setting steel at heights up to 230′. The job involves all the steel work for a new bridge to carry U. S. Highway 212 over the Missouri River between La Plant and Gettysburg, South Dakota. ▪ Constructed of high-strength tubular steel, the new boom is considerably lighter in weight than conventional booms. Although 200′ long, (without 30′ jib) it weighs 25% less than standard booms as short as 150′. Therefore, it can handle substantially greater live loads because of less deadweight of its own to support. ▪ Operator O. K. Bean reports: "I never have trouble with boom whipping now, even when carrying heavy loads high up . . . and I can boom out further without danger of overloading the crane. We can still locate the 'iron' exactly on the bolt hole the first time . . . with no lags or backlash." ▪ For specialized jobs like this or everyday jobs, you can depend on outstanding crane or excavator service from Manitowoc — check with your distributor soon!

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20 TON - 100 TON	1-YD. - 3½-YD.	1-YD. - 6-YD.	1-YD. - 2½-YD.

Construction 'Round the World...

In Holland

Jet conveyor mounted on embankment spews subbase onto foundation pad on a building job near Amsterdam. Conveyor can throw dirt or other material a distance of 60 ft at a rate of a ton a minute. It also discharges to a height of 30 ft making it possible to throw material into trucks and over walls.

In Italy

Workman operates a new air-powered tunneling muck car on a small bore tunnel job near Milan. Versatile rig is one of five new pneumatically operated machines recently unveiled by Atlas Copco Italia. Long trailing air-supply hose fitted to a rig permits it to travel more than 300 ft. Bucket pivots to reduce required headroom.

In Thailand

Elephant on Raymond International payroll clears path through jungle ahead of 300-mi highway under construction near Bangkok. Raymond employs two of the pachyderms and claims the beasts outmaneuver tractors in the jungle, handle big logs easily, and require little maintenance. Besides, says Raymond, they work for "peanuts."

Putting a "Hole" Through a Fill?

Near Bonners Ferry, Idaho, the Great Northern's main line track extends along a river that sometimes floods lowlands on the other side of the fill. Supplementing an inadequate small culvert, this Armco Liner Plate structure was installed to quickly equalize water levels and minimize danger of washouts.

Liner Plate forms railroad underpass for school children.

Armco Pipe as utility conduit is being jacked through fill.

MULTI-PLATE Pipe installed for drainage under new railroad.

You can do it quickly and easily with a durable Armco metal product

It often happens that a tunnel, conduit or underpass is required through a railroad fill. Usually, the best solution is an Armco Liner Plate structure. The reason? Pound-for-pound, Armco Liner Plates are the strongest made. And the installation can be made without disturbing the safety and movement of surface traffic.

Assembly is simple; all bolting is from within the structure. One man can carry, handle and install plates. Installation keeps pace with excavation. Armco Liner Plates are supplied in a wide selection of sizes and shapes.

Depending on conditions and size requirements, Armco Corrugated Metal Pipe or MULTI-PLATE® Pipe may also be utilized for tunnels or conduits through railroad fills. Installation may be open-cut, or by jacking. Wide range of sizes.

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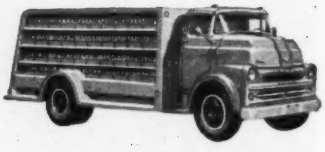
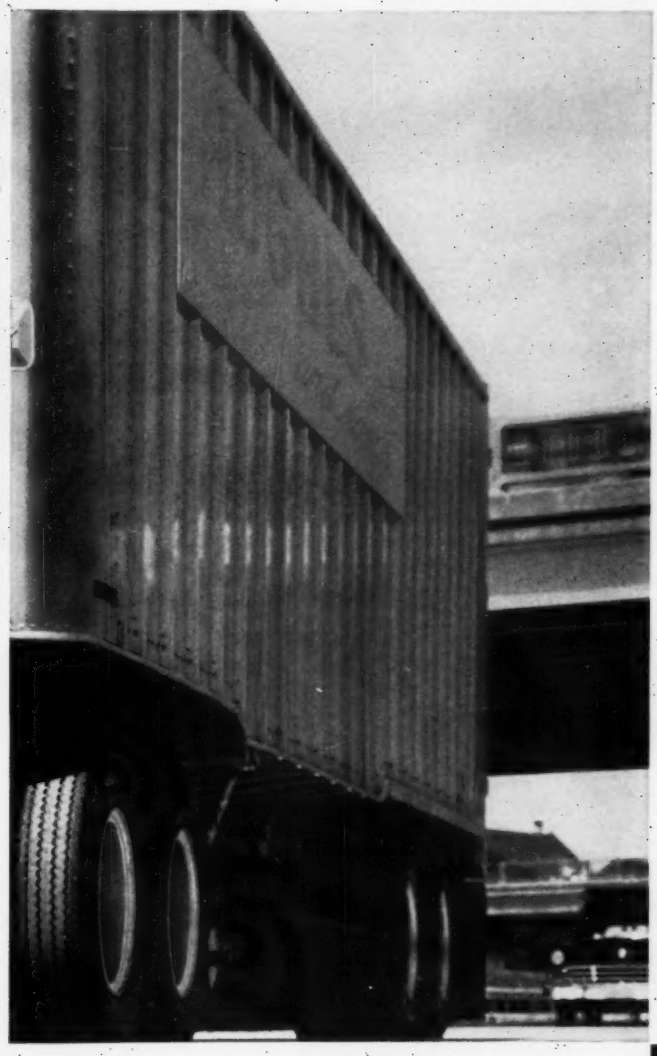


C.O.E. Models C500, C600, C700—G.V.W.'s to 25,000 lbs.; G.C.W.'s to 50,000 lbs.

drive the new 1959 *Power Giant*



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4-WHEEL-DRIVE Models W100, W200, W300, W300M, W500—G.V.W.'s to 20,000 lbs.

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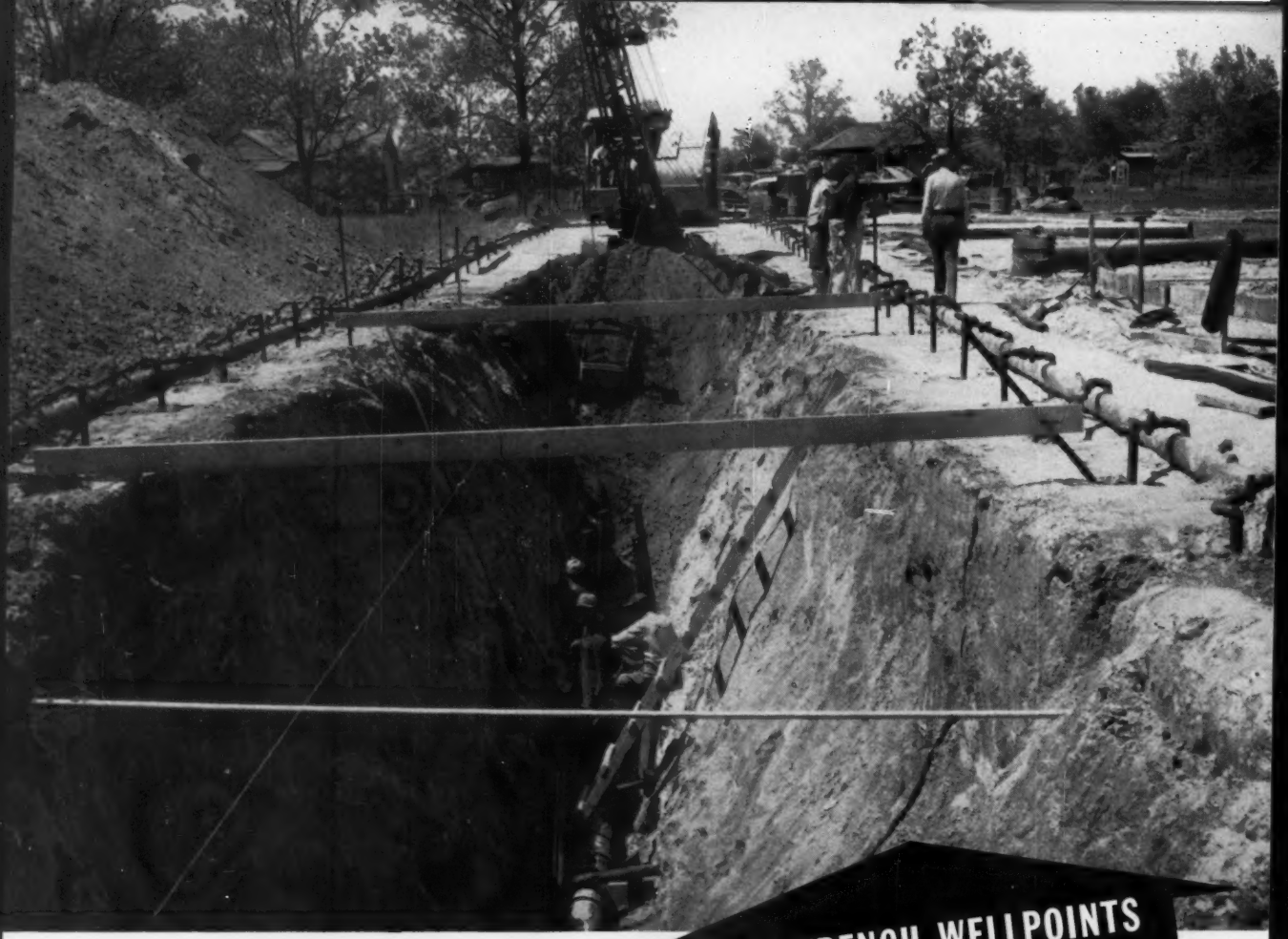

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Construction Methods AND EQUIPMENT

NOVEMBER, 1958

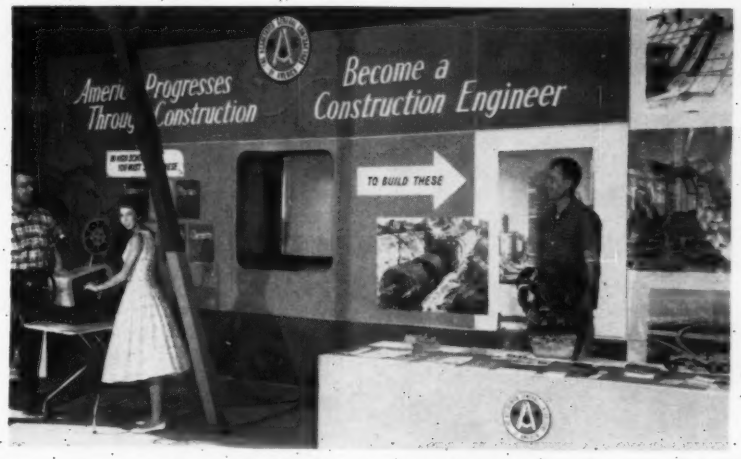
VOLUME 40 • NUMBER 11

HENRY T. PEREZ, Editor

Construction Careers

ELECTRONICS, astronautics, and rocketry are the glamour industries for engineers—or so it would appear from articles and "help-wanted" ads in the public press. And thus it is no wonder that increasing numbers of high school youths, their imagination fired by new frontiers in technology, are thinking of shaping their college courses toward careers in these fields. Many of those students, of course, might formerly have gone on to study civil engineering and enter the construction field.

To counteract this trend at the high school level the Northern California Chapter of the Associated General Contractors of America has prepared an exhibit (picture) that helps funnel students into construction. The exhibit stresses the importance of early preparation for such a career, shows what the industry does, and features a showing of AGC's educational film, "The Constructors." In all, it is a highly effective piece. And it has just won the top exhibit award at the California State Fair.



On the other side of the country, Construction Industry Professional Development Inc. has been formed in New Haven, Conn., to encourage high school students to become construction engineers. The plan proposes scholarships and summer work, and its preliminary expenses are being underwritten by Joseph Mariani of Mariani Construction Co.

Interested contractor groups in various other states are also giving scholarships, as are many individual contractors. And this is all to the good. "But," you say, "that's fine for the big outfit. I just can't afford it." Well, even if you can't afford the money, you can afford the little time it takes to give aid and counsel to high school students to interest them in construction engineering. Just as the glamour industries are pushing on to new frontiers, so is construction. And while it may be a less spectacular advance, it nevertheless offers tremendous opportunities for those who will seize them. It is only by pointing out these bright prospects and rewards to the student that we will eventually develop the trained engineers we need to continue to advance the arts of construction.

Jacks on Barge Erect Arch Bridge

Specially designed towers hold two halves of 340-ft arch on barge for 100-mi trip up Hudson River to bridge site. Jacks fitted between twin legs of towers lift each 150-ton section into place. Ingenious erection scheme enabled contractor to erect entire bridge without cranes or heavy equipment.

By WILLIAM G. MOONEY
Assistant Editor

READY TO GO—All-welded half-arch sections, fabricated in the contractor's yard, rest on jacking and support towers on double barge that will carry them to the site.

DESPITE A STORM that interrupted the work, it took J. K. Welding Co., of Yonkers, N. Y., just a day and a half to raise a 340-ft steel arch into place.

The contractor fabricated the all-welded arch in his yard, assembled it in two sections on a 200-ft-long double barge, and towed the ready-to-erect package 100-mi. up the Hudson River to the bridge site.

The bridge carries a highway across Rondout Creek, near Eddysville, N. Y. It spans the creek, which is a tidal tributary of the Hudson, three miles above its mouth.

After two weeks of preliminary work—positioning the barge in exact alignment and seating the ends of the arch sections on the bridge seats — the erection crew lifted the sections into final position by jacking them up from the barge on specially designed towers. No cranes or other heavy equipment were needed.

The bridge as assembled on the barge was practically self-erecting. Each double-rib arch section was mounted on two pairs of towers—a pair of support towers near the end of the barge and a pair of jacking towers close to the middle of the barge. Air-operated jacks between the twin legs of each jacking tower lifted the half arch sections into place.

The carefully thought-out scheme paid off in the critical erection stage. The jacking operation went smoothly in spite of the storm that surprised the contractor with the sections raised only halfway. Strong winds tore at the structure during the night but inflicted no damage. The erection crew completed the delicate operation the next day.

All-Welded Structure

State highway engineers originally designed the bridge as a conventional riveted structure. But the contractor persuaded them to revise plans to permit all-welded construction. Although the change-over did not offer any significant saving in material, it did simplify fabrication. And the switch gave state engineers their first experience with all-welded construction in this type of structure. The bridge will be the first all-welded arch bridge in the country.

The arch consists of two 5½ x 3-ft ribs connected by trussed cross-bracing. Rib spacing is 35 ft. Each rib is made up of steel plates welded together into a box section with stiffener plates welded inside the box for added rigidity. Bottom plates are perforated with 2½ x 1-ft oblong holes spaced at about 6-ft intervals to provide access to the interior of the ribs.

Procedure in mounting the two half sections of the arch on the barge was to place the arch ribs on the towers first, add the connecting cross-bracing later.

Each tower consisted of two 14-in. H-pile legs spaced 3½ ft apart. Light channel cross-pieces connected the legs of the towers. The four towers on each half of the barge were connected by heavy bracing. Jacking towers were all 69½-ft tall; support towers were of different height because of the configuration of the assembled arch sections.

The twin legs of each tower rode on a pair of 12 x 14-in. timber runners. The base of each tower leg was an 18WF96 beam, placed web down and bolted to a pair of 4 x 8-in. wood skids that rested on top of the runners. Gusset plates welded between the tower legs and the WF beam braced the towers at the bottom.

For the trip up the river the contractor set the beam supporting the base of each tower on pedestals that held them 2-in. above the runners so that grease could be applied between runners and skids at the site.

With both halves of the arch assembled and securely positioned on the towers, a tug towed barge and bridge up the Hudson River to the site.

The barge on which the preassembled sections traveled to the site was actually two identical

AT THE SITE—Workmen move supporting towers out towards ends of barge with come-alongs to bring ends of arches onto seats on the abutments. Then jacking begins.

units. Two heavy floor beams welded to the deck of each 200 x 35-ft barge tied them together.

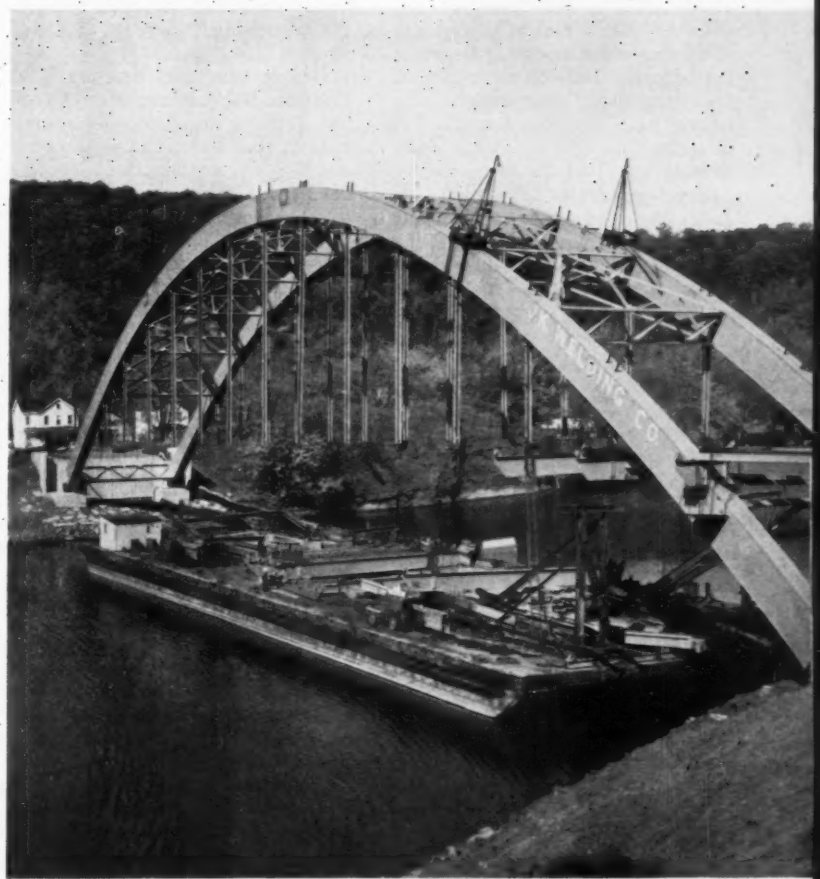
First step on arrival at the site was positioning of the barge across the stream between the abutments. Six 1-in.-dia. cables held the barge anchored in position. Two cables looped around the piers of another bridge a short distance upstream, and two lines from each end of the barge ran to anchorages on the shore. Turnbuckles in each line permitted tightening of the cables to adjust the position of the barge.

Seating the Arch

Several preparatory steps preceded connecting of the arch ribs to the bridge seats at the abutments. The contractor inserted jacks beneath the bearing beams at the base of the tower legs, cut out the pedestals, and lowered the beams down onto the runners.

Three-man crews then inched each set of towers out towards the ends of the barge along the timber rails by pulling with come-alongs. The towers slid out a total of 19½ ft to move the ends of the arch sections into line with the bridge seats at the abutments.

The tide played an important role at this stage. Depth of water in Rondout Creek drops 6 ft from high to low tide. The contractor connected the arch sections to the bridge abutments at high tide



LAST STAGE—With the arch completed, crews drop hangers to hold suspended deck of bridge. Steel for floor system is arranged in erection sequence on barge.

so that as the barge dropped with the lowering tide, the arch sections would lift off the support towers.

With the ends of each half arch supported at the bridge bearing, the support towers were no longer needed. The contractor cut them down to avoid interference with the arch ribs as the barge rose and fell with the tide.

Then each jacking tower was fixed in its final position on the barge by welding the steel base beam on top of the runner assembly to the deck. And the gusset plates bracing the base of the tower legs were cut away so that the towers could lean into the arch ribs at an angle during jacking. Bridge bearing plates between the base of the tower legs and the support beam formed a hinge that permitted the tilting of the towers.

Jacking

Next stage in erection was the crucial one—jacking each half of the arch up into final position till the sections met at the crown, 68 ft above the bridge seats. Four Duff-Norton 100-ton air-powered jacks provided the muscle for lifting the 150-ton sections. A 600-cfm Chicago Pneumatic compressor supplied air to the jacks.

Erection crews extended the jacks 24-in. at a time, alternating between the two pairs of jacking towers. The jacks rested on 18-in. channel cross-pieces held in place between the twin legs of each tower by drift pins. A similar pair of channels set on top of each jack formed a saddle that held the arch ribs.

After extending the jack ram, workmen secured the top cross-piece in position by driving 1-in. pins into the holes drilled in the flanges of the H-pile legs. Then with the jack ram lowered, the pins holding the lower cross-piece that supported the jacks were pulled out, and both jacks and supporting cross-piece were hauled up to the next level by 3-ton Tirfor cable pullers. The jacks were then set for another 24-in. jump.

The jacking operation raised each arch section in this way until both halves were slightly higher than final crown elevation. In the final step of joining the two halves at the crown, the tide again lent a hand. As the lowering tide dropped the sections, workmen inside the ribs lined up the sections by placing drift pins through the matching holes in the butt ends of the ribs.

Before the arch reached final position, the erection crew guyed the jacking towers to the arch ribs so that the tilted legs would not flop over when the load was released. With this precaution taken care of, welders joined the two halves. The J. K. Welding construction crew then lowered the jacks, and the arch stood on its own at last.

Erecting the Deck

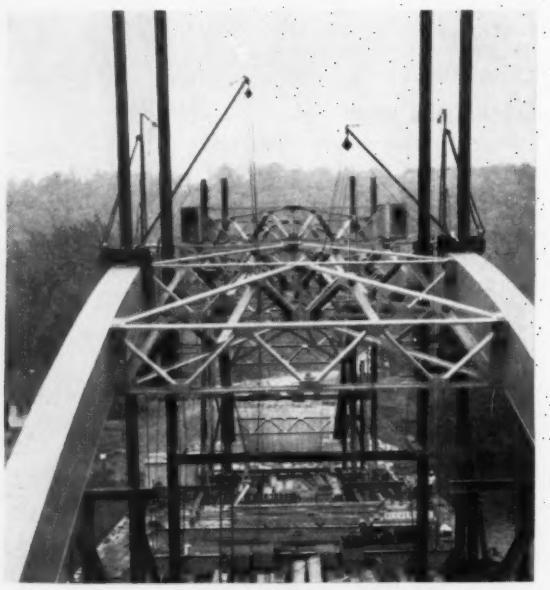
The big job was over, but there still remained erection of the deck system. Roadway of the bridge is suspended from the arch by hangers that hold the ends of the floor beams. Longitudinal stringers brace the floor system and support the concrete deck slab. The contractor arranged the structural steel for the floor system in carefully ordered sequence on the deck of the barge so that each piece would be ready at hand.

A pair of winch-operated hoisting rigs traveling along each arch rib handled erection of the floor system steel.

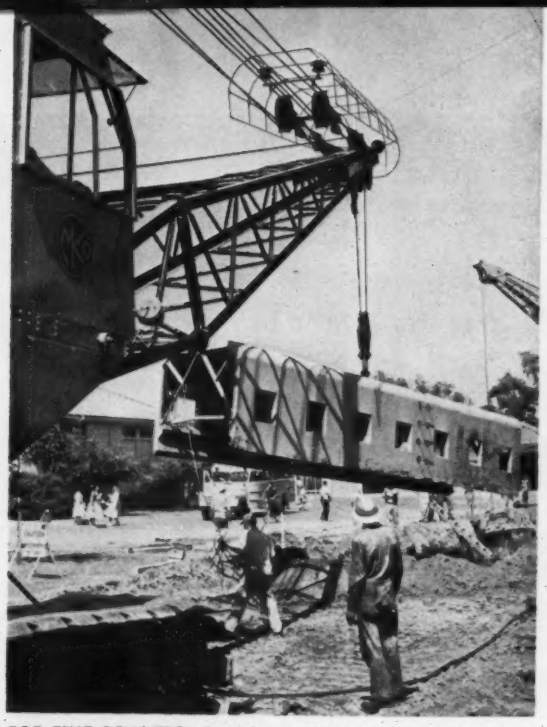
A clamp-like base fitted around the outside of the arch ribs held the rigs securely in place and prevented them from overturning. On the inside of the ribs, where cross-bracing created an obstacle to movement, a pair of angles bolted to the cradle of the rig slipped down alongside the inside face of the rib and guided the rig.

The bridge will be complete and ready for traffic by the end of the year. Shanahan Construction Co., of Ellenville, N. Y. is the general contractor on the job. Arthur Miller is superintendent for J. K. Welding Co., subcontractor for both fabrication and erection of the structural steel.

JACKS—Drift pins hold cross-pieces that support jacks. After each 24-in. jump, cable puller hauls assembly up to next position.



HOISTS—Winch-operated hoisting rigs that travel along the arch ribs handle placement of floor beams and stringers for deck system.



FOR FINE-GRADERS—Steel housing 35 ft long protects workmen handling fine-grading. It gives positive protection against cave-ins.

FOR WELDERS—Half-circle safety cage, with sides of heavy wire mesh so air can pass through it freely, safeguards the welders.

Safety in the Trench

A PAIR of unusual trench shields help make construction of the $12-million Santa Ana Pipeline in Southern California a safe and fast-moving job.

One is a steel housing that safeguards workmen during fine-grading of the trench floor; the other is a half-circle steel cage that protects welders.

Morrison - Knudsen Co. and Macco Corp., joint venture contractors for the 14.2-mi water pipeline, designed the two shields in cooperation with the fabricator, Century Steel Products, Inc., of Lynwood, Calif.

About 5 mi of the pipeline runs through the crowded residential and commercial areas of La Habra and Brea, industrial communities about 35 miles southeast of Los Angeles. The remaining 9 mi is in relatively open country. The contractor is working from each end.

In the urban section, the contractor has only a 30-ft right-of-way, and the trench must be 10 ft wide to accommodate the 8-ft-dia pipe. With such cramped working space, M-K-Macco decided a single machine would have to do the job.

They picked a Manitowoc 4500 dragline and fitted it with a bob-tailed boom only 60 ft long. Because of the network of overhead power lines, the tip of the boom is protected by an insulated guard.

The Manitowoc swings a big 5½-cu-yd bucket to dig the trench. It is fitted with a two-part line and a quick-coupling device so it can be converted into a crane in 60 seconds. After it has dug out a section of the trench, it lowers the steel housing shield for the fine-graders, then it places a section of pipe.

The steel housing is 35 ft long and 7 ft wide. It consists of seven 5-ft sections bolted together and covered with ¼-in. steel plate. The entire unit weighs about 4 tons. It was built at a cost of about $5,000 of channel and angle iron.

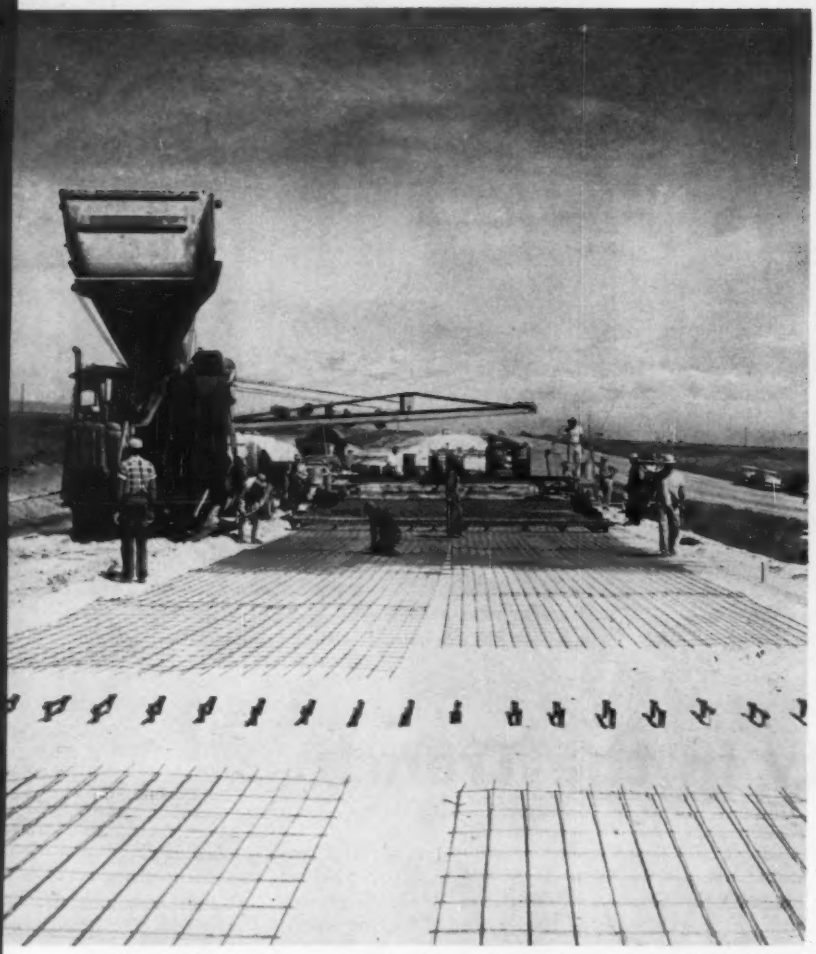
Each of its seven sections has a 24-in. square port on either side. Fine-graders hand excavate material from within the housing and toss the excavated material out through the ports. The housing affords positive protection against cave-ins and makes it unnecessary to put in shoring to brace the walls of the 14-ft-deep trench.

In the open country at the other end of the job there is plenty of room for equipment to operate along the sides of the trench. But providing protection for welders working around the pipe posed a special problem because of the intensely hot weather.

M-K-Macco decided the wood huts often used to protect welders in a trench would not afford adequate ventilation so they designed a steel safety cage that permits air to pass through freely. The cage is smaller and lighter than a wood hut; it cost about $450 compared with $350 for a hut.

The cage is rolled to fit the 8-ft-dia pipe. Its inside diameter is 8 ft 5 in.; its outside diameter is 14 ft 5 in. The outside is covered with a skin of 3/16-in. steel plate. Sides of the cage are heavy wire mesh.

Project engineer William H. McMurren gives the two shields part of the credit for the fact that so far on this job there have been no injuries from cave-ins or falling debris. The project was started last July and is scheduled for completion in the spring of next year.



IN ONE PASS—Slip-form paver lays two lanes of 8-in. reinforced concrete. Sled, designed by contractor, moves in front of paver to feed in wire mesh reinforcing at proper height.

SLED—Runners extending back from front of sled hold up reinforcing wire as crew

Slip-Form Paver with Sled Places

SLIP-FORM PAVING for a highway job? It's a slick technique—when you're laying plain concrete. But how do you manage it when the specifications call for reinforced concrete?

Until this summer, a contractor who had to lay reinforced paving stuck to the old method of putting down one layer of concrete, laying the reinforcing on top of it, then bringing the paver back for a second run to put down the top layer of concrete.

Now a couple of contractors have come up with a workable spread that lays reinforced slip-formed pavement in one pass. And it can put it down almost as fast as plain concrete.

The key rig is a sled that moves ahead of the paver and holds the reinforcing mesh in position while the concrete is poured around it. The idea was worked out by Western Paving Construction Co. of Denver, Colo., and Roberts Construction Co. of Lincoln, Neb., for a highway job on Route 87 near Castle Rock, Colo. Western and Roberts jointly had a $1-million contract to enlarge the existing two-lane highway into a four-lane route.

Total length of the new road was 15.3 mi, but only 1 mi was paved with the new method. This short section was one of four experimental sections on which the Colorado Highway Department allowed contractors to propose alternate methods.

On the section where the sled was first used, specifications called for an 8-in. slab with welded wire fabric reinforcement. The mesh was to be placed 2 in. from the top of the slab.

The contractors wanted to achieve the economies of slip forming. But with slip forming you can make only one pass. So they had to figure a way to get the reinforcing in on the first pass. The sled was the answer.

Structurally the sled is shaped like a large U, with the closed end pointing forward. The open arms are attached to the forward arms of the paver on a ball and socket joint.

The outside arms of the sled are 6-in. steel box girders. The

pours concrete around it. Sled is a simple U-shape rig. Side bars are steel box girders connected to paver. Front consists of a steel I-beam with wheels mounted underneath.

JOINT PROTECTION—Timber ramp opposite joint in pavement lifts sled over expansion dowels that are set in advance. This prevents sled from bending dowels.

Reinforced Concrete

front end is a 6-in. I-beam. Eight-inch wheels are attached under the forward corners, and two 6-in. wheels under the center of the I-beam facilitate forward motion.

A 3-in. pipe across the front of the sled helps the wire mesh slide up and over the sled. The contractors found it necessary to add a second 1-in. pipe later for the same purpose.

Eight runners, attached by hinged joints to the front I-beam, run between the box girders and parallel to them. The runners are 6-in. steel plate, ¾ in. wide at the bottom. Each is 10 ft long. They are dragged along as the extending arms of the advancing paver push the sled forward.

The runners are spaced at intervals, left to right, of 34 in., 36 in., 36 in., 21 in., 21 in., 36 in., 36 in., and 34 in.

Like any new rig, the sled developed a few "bugs." For instance, at first it tended to dig itself into the subgrade as it was pushed forward. The contractors overcame this by attaching 4-in. steel plates to the bottoms of the runners about 2 ft from the front.

Another problem was the dowel bars, placed in advance for the permanent joints in the pavement. The sled bent these bars down as it hit them. A simple wood ramp, placed in front of the wheels of the sled just as they reached the line of the joint, lifted the sled over the dowels.

At first the movement of the sled caused the wire mesh to come apart at the overlap joints. Even stronger wire connections did not solve the problem completely. So the crews tried continuous mesh and cut the wire at the joints after the concrete was poured.

The contractors laid an average of 2,000 ft per day of non-reinforced concrete, 1,650 ft per day with the sled on the reinforced pavement. This was for a 10-hr day with no shutdown. Ten additional men were needed to handle, spread, and tie the wire mesh.

Because the experiment lasted only 1 mi, the contractors say they never reached full efficiency with the new method. But they figure that if they could have continued with it, they soon would have been laying reinforced concrete in slip forms as fast as they could lay plain concrete.

. Here's how a 2-mi conveyor moves 9,400,-000 yd of impervious core material for the world's highest earthfill dam, the $46-million Trinity Dam.

FROM THE BORROW PIT—Caterpillar D9 push-loads DW20 that hauls impervious fill short distance from borrow pit to hopper.

INTO THE HOPPER—Fill passes through hopper onto a 48-in.-wide conveyor that carries it to a crusher station a few yards away.

Conveyor Moves Fill Down

FROM THE AIR the high-speed conveyor resembles a zig zag catwalk that cuts through woodland clearings and bridges chasms on its way down the mountain.

But the conveyor—it's 2 mi long—plays an important role in placing impervious fill for the core of the world's highest (537½ ft) earthfill dam.

The structure is the $46-million Trinity Dam in Northern California, key unit in the Bureau of Reclamation's $225-million Trinity River Division of the Central Valley Project. Trinity Dam Contractors, Inc., a joint venture sponsored by Guy F. Atkinson Co., designed the belt to carry 9,400,000 yd of impervious fill for the dam's core.

Specified for the core was a weathered andesite almost granular and with far less plasticity than the clay-type material that usually appears in impervious cores. It was selected because, though it is more plastic than ordinary sand and gravel when wet, it compacts into one of the finest impervious cores possible.

The only economical source for this fill was a borrow area located on a mountaintop 1,500 ft above the dam site. This contained an estimated 40,000,000 yd of material in a strata 20 to 60 ft deep.

Height of the borrow area and ruggedness of the terrain suggested belt haul as the most economical means of getting the fill down to where it was needed. Belt haul is not new. Such a system was used 12 years ago in the construction of the Bureau of Reclamation's Anderson Ranch Dam in Idaho. But Anderson Ranch Dam did not require nearly as much material, and the terrain there was not nearly as rugged.

The contractors carefully compared the advantages and disadvantages of belt haul over some form of truck haul. One big problem was that if a belt were used it would have to be specially designed to meet the problems of terrain. More disturbing was the fact that a belt system would be a sink-or-swim proposition. Should the belt have a failure—even a minor one—production would come to a full stop. With trucks, even if 30% of them broke down, production would drop only 30%.

The contractors decided, though, that despite possible production setbacks, a belt haul system seemed most likely to do the job. Together with Jacobs Associates, San Francisco consulting construction engineers, the contractors designed the system themselves so they could get competitive bids on individual units that would go into the belt construction—eventually to cost $2 million.

For example, Link Belt supplied the trestle, towers, bents, and belt feeders. B. F. Goodrich supplied more than 18,000 ft of rubber belting; General Electric supplied motors; Willamette Iron and Steel Co., brakes and roller gates; Barber-Greene Co., the conveyor rolls; Gruendler, the crushers; Tyler, the screens; and Guntert & Zimmerman, the tanks and other steel.

Result is a belt system that

THROUGH THE CRUSHER—Crusher station reduces all material over 4 in. and feeds the fill onto the first flight of the conveyor.

DOWN THE MOUNTAIN—Conveyor consists of nine flights ranging in length from 1,895 ft in flat stretches to 655 ft on steep slopes.

a Mountain

travels at a rate of 650 fpm and carries about 1,400 yd of fill material an hour. How the conveyor fits into the earthmoving scheme can be seen by following the fill material as it is dug up out of the borrow pit and moves to its final placing in the dam's core.

Rubber-tired scrapers, mostly Caterpillar DW20's push-loaded by Caterpillar D8 tractors, pull up the material from the borrow pit. They haul it several hundred feet, and dump into two hoppers. These hoppers are open between tire-track troughs that are slotted to pass material.

Material passes from the hopper onto a 48-in.-wide belt that carries it to a crusher station a short distance away. This crusher station does three jobs: It crushes material over 4 in.; it feeds a main belt that carries the material down the mountainside; and it acts as an upper-end control station.

Crushing oversized material is a specification requirement, and it also makes the material easier to handle on the belt.

Originally the contractors installed single-roll rotary crushers similar to those used in coal mining. These worked fine for ordinary weathered andesite, but they did not handle the occasional hard boulders. So Atkinson placed the rolls on eccentrics, increased their speed, and in that way converted them into impactor type crushers.

From the crusher station, material goes onto the main conveyor belt system. This is made up of nine flights of 42-in.-wide rubber belting that travels in a zig zag course down to the dam area.

Lengths of these flights vary from 1,895 ft center-to-center of pulleys for relatively flat stretches, to 655 ft for steeper flights. Five of the flights have about a 25% grade; the remaining four have flatter grades. A typical drop on one of the steeper flights is 162 ft.

Flight lengths were determined by the amount of power needed to keep the conveyor under control. For most of the flights, 400-hp does the job. Much of the braking comes from the electric motors that act as generators under full belt load and pump power back into the electric power system.

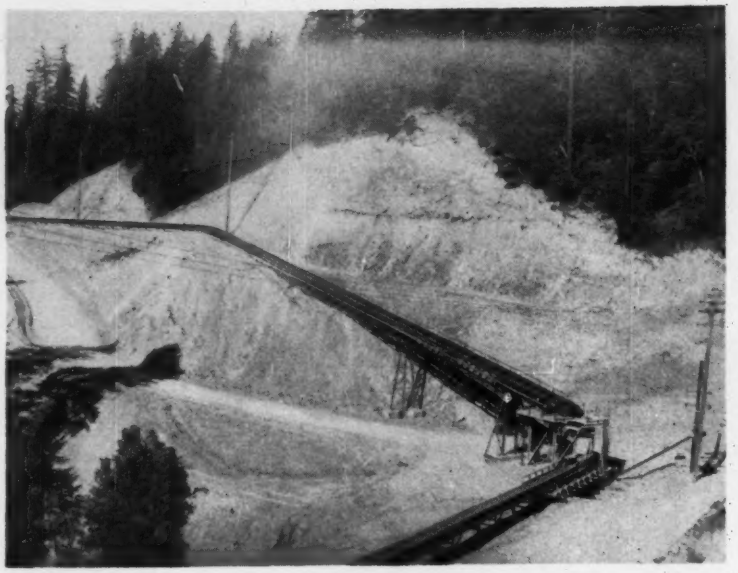
Typical braking stations have 300-hp motors. Original installations had an additional 100-hp motor on the same shafts. But these were replaced by specially designed fans that provide added resistance as fan speed increases. Each fan is powerful enough to keep an unloaded belt from running away. Also provided are mechanically operated brakes specially designed for the job. These are bigger than many found on power shovels.

All control devices are coordinated electronically so that flights stop and start in controlled sequences. The belt itself originally was designed to operate at 600 fpm. But belt speed already has been stepped up substantially to increase capacity, and the contractors are studying ways to increase speed still further.

Transfer points between flights are critical spots. Though weath-

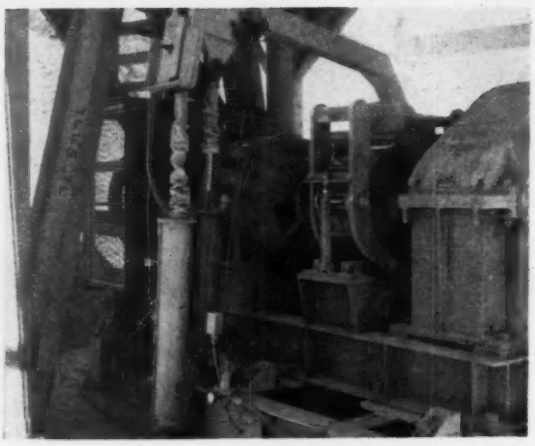
CONVEYOR MOVES FILL DOWN MOUNTAIN . . .
continued

Transfer Points Are Critical in Conveyor System



BETWEEN FLIGHTS—Great care went into setting up transfer points to prevent a slowdown in the material flow.

LOADING—Material transfers between belts through conical chute that prevents the fill from piling up, slowing down, or clogging.



BRAKING—A 300-hp motor acts as generator and brake supplementing mechanical brake and fan (inside screen) that control belt.

ered andesite primarily is granular in nature, it has enough plasticity to be troublesome. So chutes are provided to keep the material from losing speed and from piling up and clogging.

The chutes originally were square, but the contractors changed them to a conical design to improve the operating characteristics. The problem now is wear of the chute material. Atkinson is looking for a design that will permit quick and easy replacement of worn sections.

A man at each transfer point insures full operation of the belt. Material flowing down the belt occasionally is stopped to allow time for transfer station men to inspect and clean out chutes. But they are trying to set up the entire belt operation for remote control with only an occasional patrol of the belt.

Most dramatic and smoothest operating phase of the conveyor system takes place at the terminal station down by the dam site. Material comes off the final flight of the conveyor and passes over a 60-in.-wide shuttle conveyor into one of three bins. As the material spills into the bins, water is added to improve the compactive characteristics of the andesite.

Total capacity of these bins is about 1,000 yd, approximately an hour's belt run. Should all the bins reach capacity—they seldom do—a bypass belt stacks the material on one side where scrapers can pick it up.

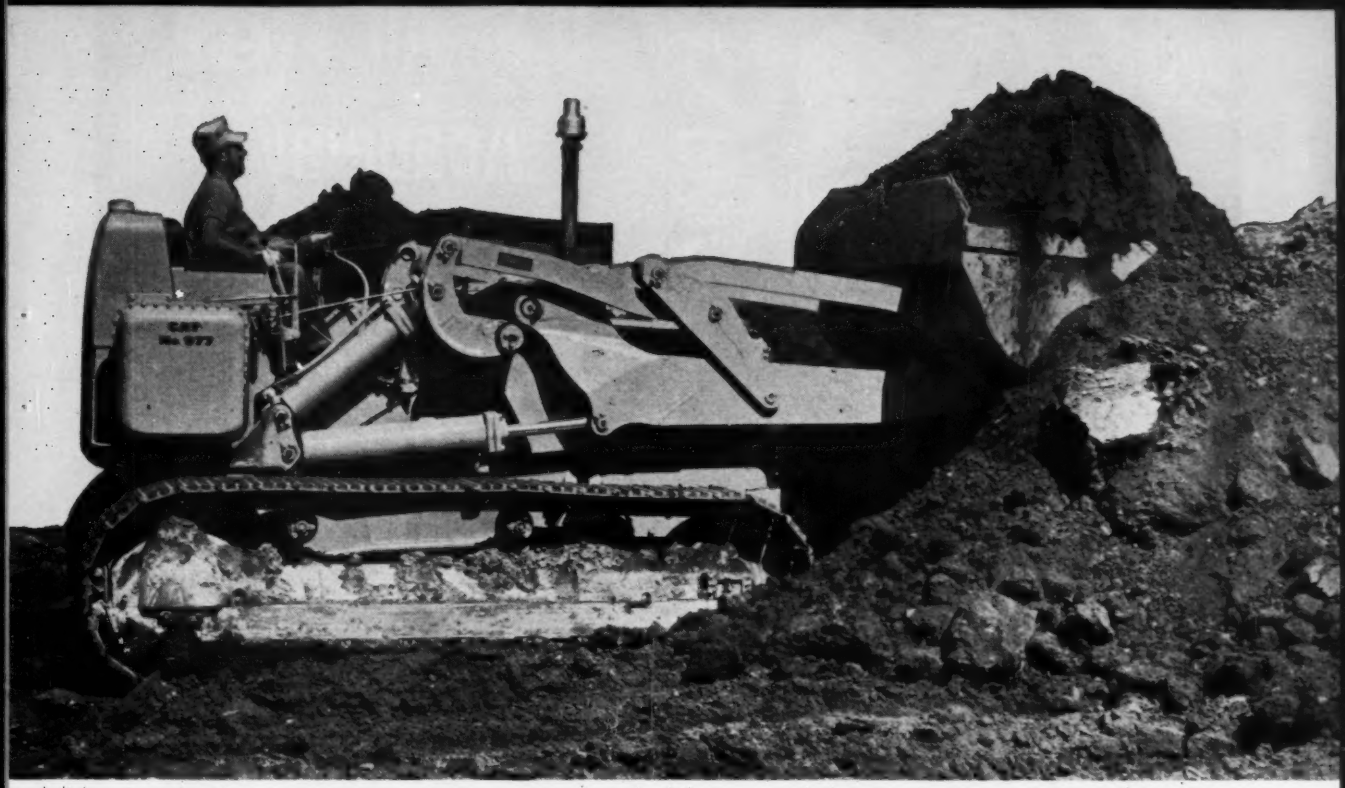
At the bottom of each bin is a pair of roller gates, operated by large-sized air rams. This provides a 7-ft opening through which the material falls into an automatic weighing hopper that functions somewhat like a gravel weighing hopper in a batch plant. The weighing hopper also is fitted with a set of air-ram-operated roller gates.

The bin operator trips the roller gates and the material is measured out through the weighing hopper into a 25-yd scraper. Once the weighing hopper is empty a new load charges into it to ready it for the next scraper. A scraper can be loaded every 20 sec.

Placing the Fill

Scrapers then carry the material to the dam site, a haul of about 2,000 ft. The contractors' fleet consists mostly of Caterpillar DW20's and a few Euclids. All

"WILL OUTPERFORM ANY MACHINE IN ITS CLASS!"



This Cat-built Traxcavator is loading out soil from spoil heap for grade fill and shoulders—loads out 10-yd. trucks, servicing 5 trucks with a 2-mile haul. Handling damp hard-pan, the husky No. 977 operates in 2nd and 3rd speeds and loads 10 yd. in 2½ min., averaging up to 2,000 yd. per 10-hr. day. The Minnesota State Highway job is 5.4 miles long and it calls for an excavation of 840,000 yd. of all classifications.

That's the way Mr. Markham of the E. Markham Construction Co., St. Paul, Minnesota, feels about his Cat No. 977 Traxcavator, shown loading out soil for grade fill and shoulders on a state highway improvement job in St. Paul.

Owner Markham feels that CAT-built equipment is the "most reliable and best mechanically." He says, "Caterpillar Tractor Co. has wisely shown an understanding of the contractors' equipment needs —no fancy do-dads that look good on paper and flop in operation—just down-to-earth improvements that really work."

Dependable, versatile performance is typical of Caterpillar's line of Traxcavators, from the rugged No. 977 to its tough, agile smaller brother, the No. 933. These finely balanced work units are engineered for the *hard* work, with welded steel frames, lift arms and cross braces of strong, box-section construction, and tilt arms of solid steel. They're easy to handle with quick-acting hydraulic controls.

The 50 HP No. 933, as well as the larger No. 955 and No. 977, are available in the new Series E, with extra-sturdy undercarriage for applications which put the greatest stress on your equipment. And the new side dump bucket can be had for the No. 955 and No. 933 Traxcavators. For complete details, see your Caterpillar Dealer. He'll be glad to talk your kind of language in a deal for the best in earthmoving equipment. And he'll back you up on expert service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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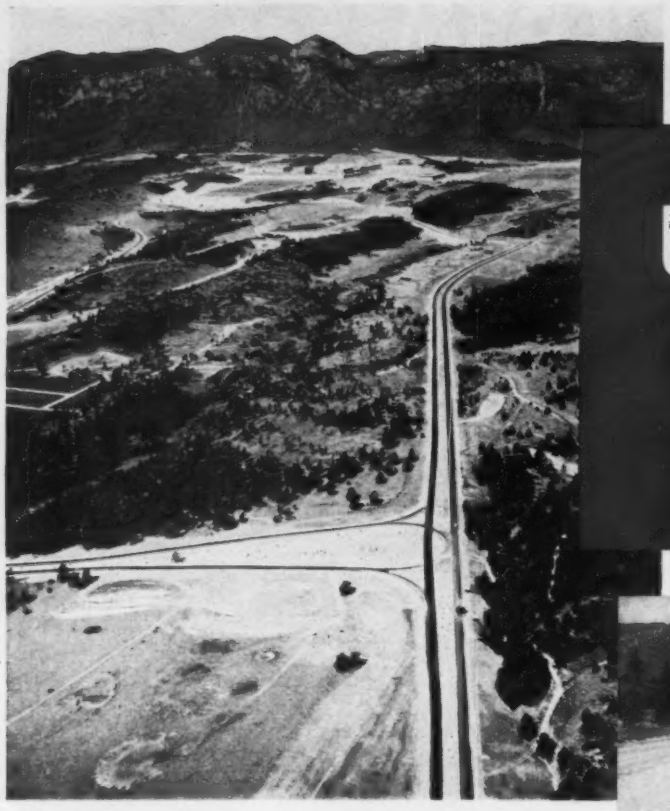
A NEW DIMENSION IN LOADER VERSATILITY

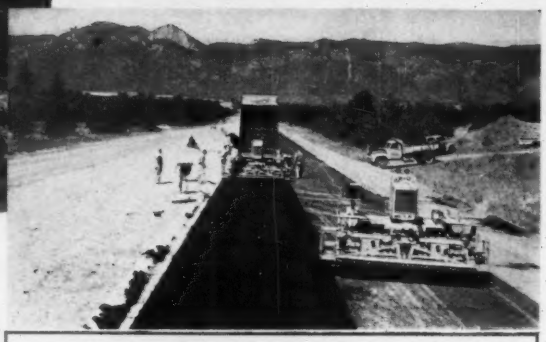
(*Photos by Stewart's for Exchange National Bank*)



View of Air Force Academy from a helicopter. Main buildings of Academy in background, at foot of Rampart Range of the Rockies.

U.S. Air Force Academy

COLORADO SPRINGS, COLO.



Its network of roads is paved with durable Texaco Asphaltic Concrete

Although it is interested primarily in air transport, our new Air Force Academy could not function efficiently without its network of more than 50 miles of 4-lane and 2-lane roads.

The wearing surface, base and subbase constructed on these roads provide a pavement which is flexible from top to bottom. It consists of a 6-inch gravel subbase, covered by a 4-inch crushed stone base. After the base is primed with a medium-curing Texaco Cutback Asphalt, it is topped by a wearing surface of resilient, rugged Texaco Asphaltic Concrete 2 to 2½ inches thick.

Thanks to the flexible character of this type of pavement, it maintains complete contact with the supporting subsoil at all times. This is why flexible paving is able to withstand heavy traffic longer than rigid paving and at a lower upkeep cost.

Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils offer the road builder a wide choice of pavement types. These range from heavy-duty paving for Interstate Highways to inexpensive asphalt surface-treatments for suburban residential streets. Helpful information on all types of asphalt construction for roads, streets, airports and parking areas is supplied in two free booklets. Write our nearest office for copies.

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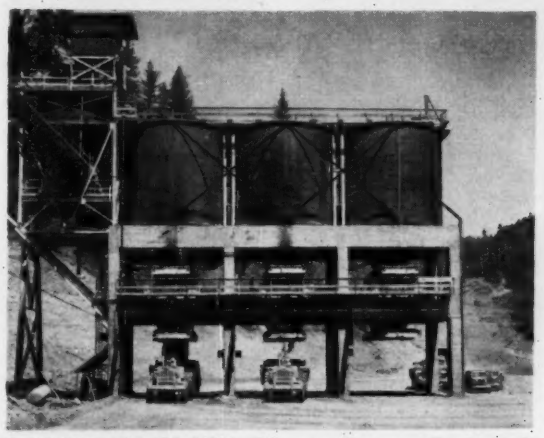
TEXACO REG. T. M.

TEXACO ASPHALT

Scraper Loads in 20 Seconds



TERMINAL END OF LINE—Fill material comes off 60-in.-wide shuttle into three bins each fitted with a 25-yd weigh hopper.

CONTROLS—Supervisor in tower controls operation and checks loading by TV camera.

FAST LOADING—Scraper pulls in under bin, rig's operator trips 7-ft hopper gate, and scraper pulls out fully loaded in 20 sec.

WETTING FILL—Nozzle fitted to bottom of the conveyor alongside the bins jets water into the material just before it enters bins. This makes fill easier to compact.

have been lengthened slightly and fitted with sideboards to increase their capacity.

The contractors keep six scrapers busy placing an average of 1,000 yd hourly down a 10% grade. Scrapers are equipped with Hydrotarders for better control on steep grades. The bin elevation is about at mid-height of the dam. Thus, for the lowest part of the dam a haul down a 10% grade is involved. For the top of the dam haul is up a 10% grade.

Specifications require that material be placed in compacted 6-in. layers, so it is spread in 8-in. lifts. Once impervious fill is in place it is rolled by 6-ft-dia sheepsfoot rollers that, fully loaded with water, weigh some 5,100 lb per lin ft. These machines make 12 passes over each lift to bring compaction up to required density. Some scarifying is necessary, and some water is added to the fill to replace that lost through evaporation.

Working two 9-hr shifts, the contractors are placing as much as 25,000 yd daily. The two-shift operation stretches from 7 am to 2:30 pm, permitting ample time for equipment maintenance. Major overhaul, however, is handled on Sundays as the job is on a six-day week.

Other Fill

The core will be flanked by a 3,800,000-yd zone of weathered rock that will serve as a filter. The shell will be constructed from tailings and screenings left from gold dredging operations. This will require 13,400,000 yd. The toe at each side of the dam will be made of 2,800,000 yd of quarried rock. Both faces will be protected with a total of 200,000 yd of rip rap.

Haul for these other fill materials is relatively short—up to 3 mi on nearly level haul roads. Some of it comes from directly below the dam where the contrac-

Big Rigs Dig, Place Dam Fill

SCRAPERS BUILD CORE—Fleet of scrapers spreads impervious fill for the dam's core in 8-in. lifts that tractor-drawn sheepsfoot rollers, operating in tandem, compact to the specified 6 in. Fully loaded with water, the rollers weigh 5,100 lb per lin ft.

SHOVELS LOAD SHELL FILL—Bucyrus-Erie 150-B electric 8-yd shovel loads dredge tailings slated for dam's shell into Mack-drawn bottom dump Southwest 30-yd trailers.

tor is required to excavate a powerhouse discharge channel through the gold dredge tailings. Much of it will come from deposits in the reservoir area. And a substantial amount of fill will come from removal of a prehistoric earthslide just downstream of the dam above the powerhouse location. The contractors employ a wide variety of earthmoving equipment for this work.

The Contractors

Contractors with Atkinson in the joint venture are M. J. Bevanda, Charles L. Harney, Inc., Ostrander Construction Co., A. Teichert & Son, Inc., and Trepte Construction Co.

A. H. Steiner is project manager; Roscoe Downs, assistant project manager; John Eilers, project engineer; and Joseph McNabb, general superintendent. For the Bureau of Reclamation, L. B. Ackerman is project construction engineer; Howard E. McInnis, assistant project engineer; Gilbert G. Drake, office engineer; and Marion Archibald is in direct charge of the dam construction.

LIFT PROFITS

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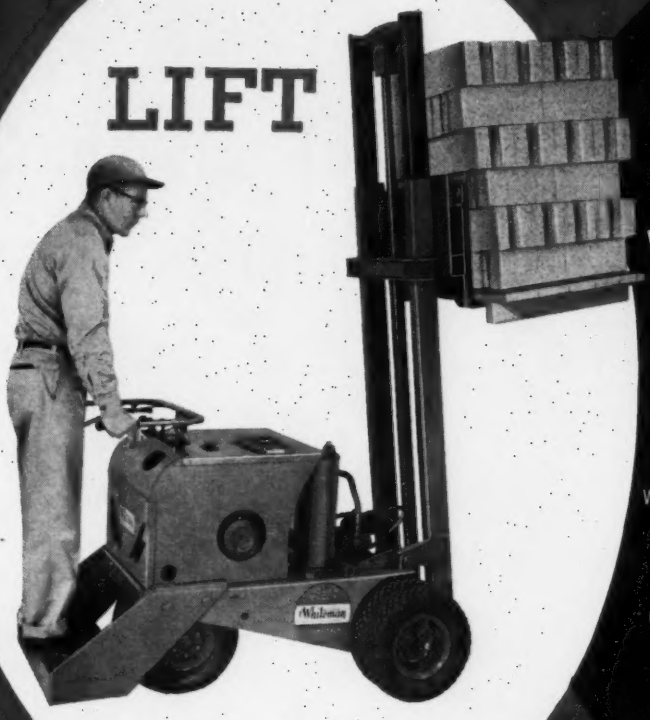

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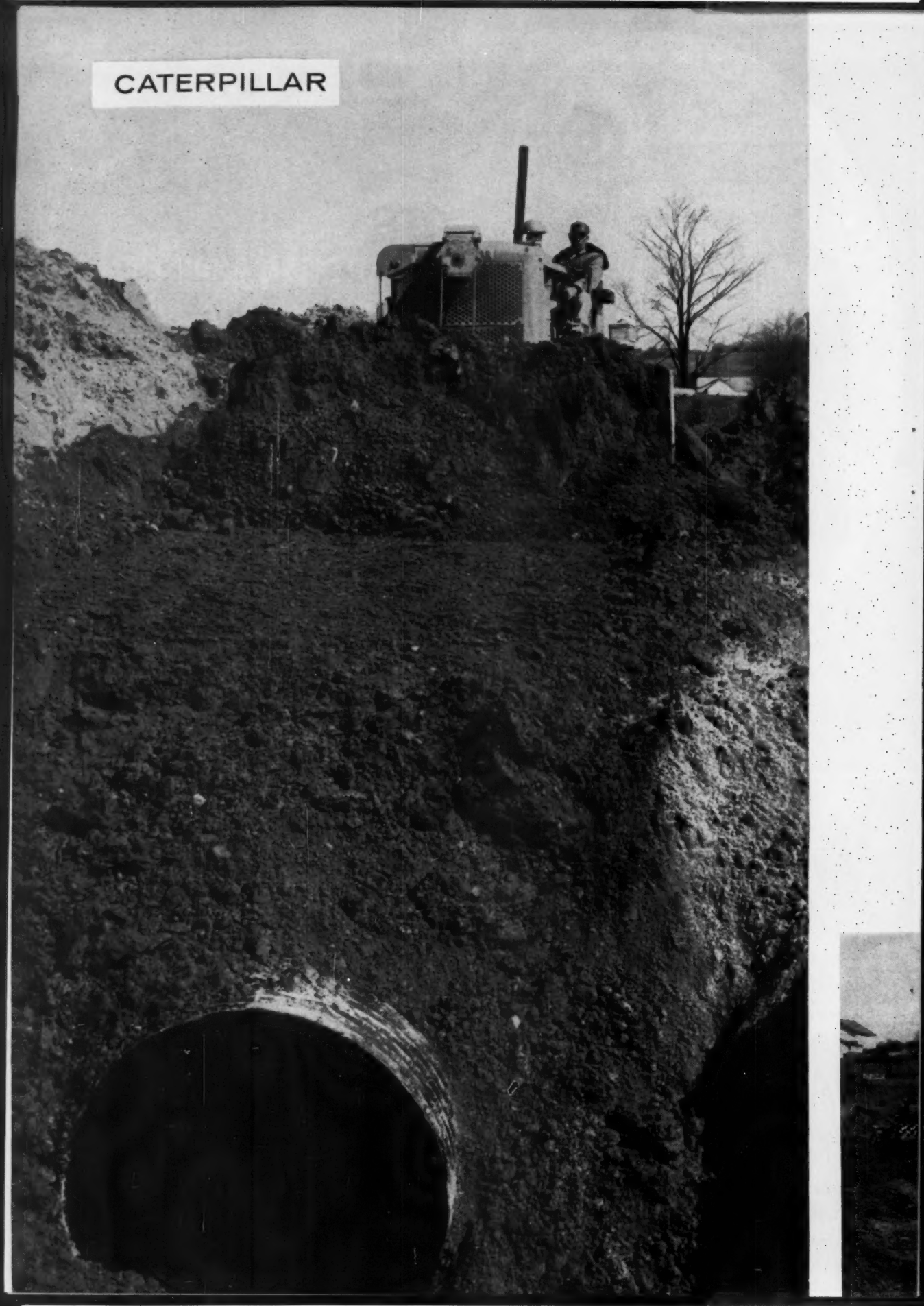
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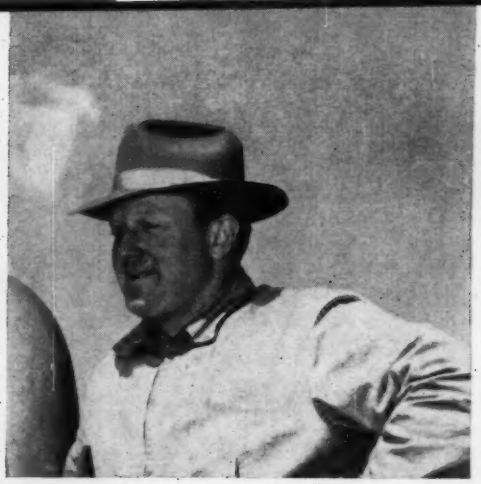
INTERSTATE HIGHWAY SYSTEM

REPORT FROM OHIO:

Contractor tools up with Caterpillar equipment for his biggest job



Wilson H. Rownd, Vice President of General Asphalt: "Our Caterpillar equipment has always done its job without our babying it. Those DW21-No. 470s are fast loading and big producers. We've had very little down time. Our operators prefer Caterpillar — and so do we."

"What equipment do I need to do this job profitably?" That's the first question a contractor asks when he gets a large contract. And Caterpillar provides the answer to most successful contractors. Here's what happened recently on a highway project in Ohio.

Relocation of 5.632 miles of U.S. 62 between Millersburg and Berlin was awarded to the General Asphalt Paving Co. of Canton for a low bid of $1,091,095.04—the largest earthmoving contract in the firm's 38-year history. It involves moving 511,000 cu. yd. of earth, clay and shale.

To beef up its fleet, General Asphalt purchased three Caterpillar DW21 wheel-type Tractors with No. 470 LOWBOWL Scrapers, and a Cat D9 track-type Tractor with No. 9S Bulldozer and No. 9 Ripper. Other Caterpillar equipment on the job includes four D8s, a D2 and a No. 6 Shovel.

This project is part of the ABC System of roads that supplements the planned 41,000-mile National System of Interstate and Defense Highways. As work gets under way on this greatest construction job in history, more and more contractors are standardizing on Caterpillar equipment. A recent survey of the $415 million Illinois Toll Highway showed that 53 per cent of the equipment at work was Caterpillar.

These contractors have found that for profitable production you can't beat the combination of good machines and good dealer service. Your Caterpillar Dealer can help you to a profitable low bid by showing you how to figure on the high productivity of the big, yellow machines. Ask him today to demonstrate on *your* job. It's the best way to make sure you get your share of highway work.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

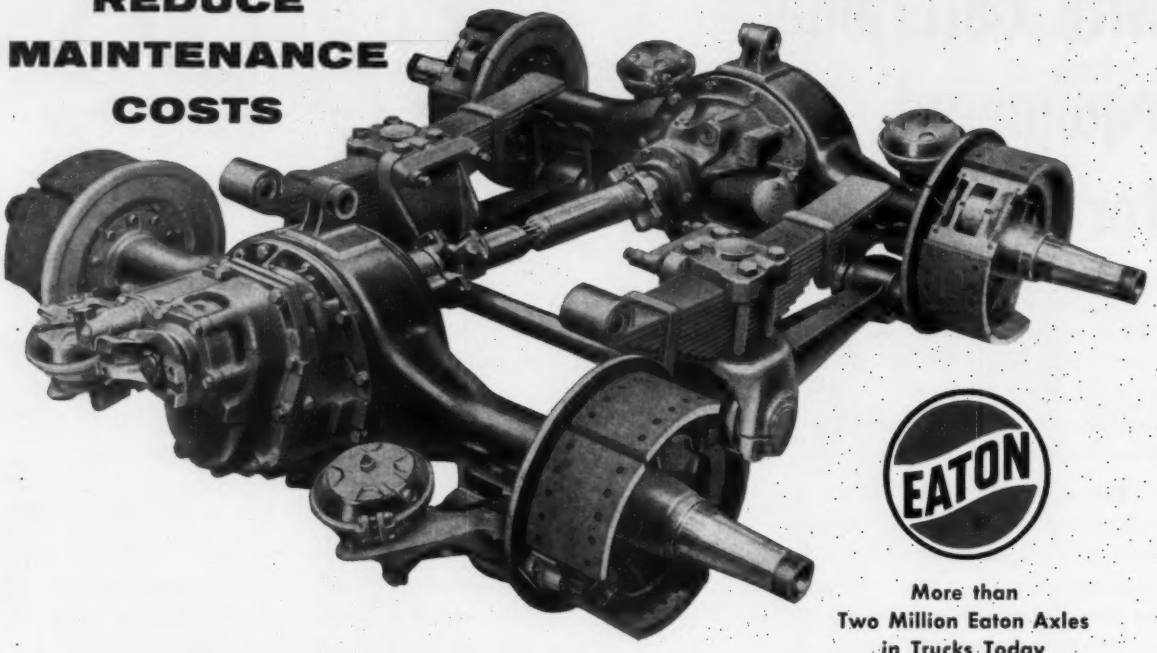
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Cat D8 Tractor, left, bulldozes on highway relocation project. Below, a DW21-No. 470 unloads behind a D8 pulling a sheepsfoot roller. Scraper cycle is 4,800 ft.

Three other D8s and a D9 also rip and push-load. Fleet averages 6,000 cu. yd. of earth moved a day. Roadbed will be 40 ft. wide. Contractors agree Cat-built machines are dependable.

NEW EATON TANDEMS haul more legal payload—

REDUCE MAINTENANCE COSTS



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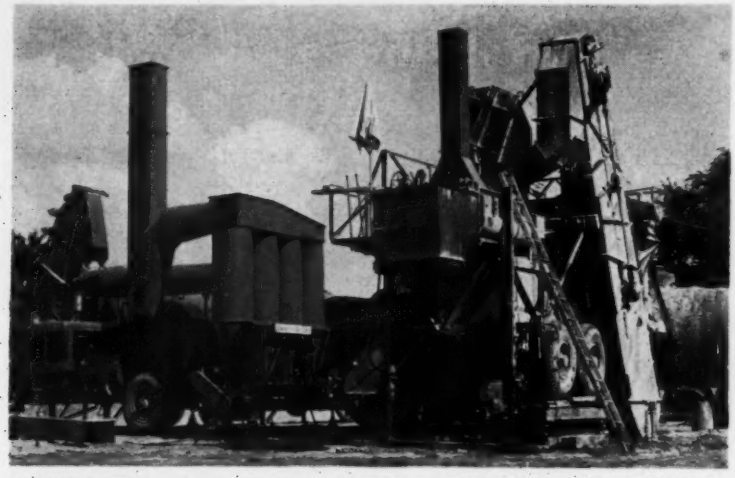


WORKS BETTER—After it was converted to butane, this Barber-Greene model 845 continuous-type asphalt plant turned out increased quantities of a better mix at a lower cost.

LPG Cuts Fuel Costs For Asphalt Plant

BY CHANGING OVER its plant to operate on liquefied petroleum gas instead of fuel oil, a Kansas asphalt supplier reduced operating costs, boosted production, and improved the quality of its mix.

Because the Freeto Asphalt Co. of Pittsburgh, Kans., operates in an area where butane is readily available and inexpensive, the company cut its fuel bill by about 33%. But these fuel savings would not apply in other areas of the country where supplies of butane or propane are limited. Freeto, however, discovered other advantages besides lower fuel costs when it converted its model 845 Barber-Greene plant to LPG.

"At the same time that our unit heat costs per ton of material were reduced, the LPG fuel system increased production," says Ralph Gore, Freeto's vice president. "We haven't had any trouble with the LPG system, and we are able to process more material while maintaining an even 300-deg temperature. Because this is so, material 'sweats' less and we feel we turn out a better end product. Butane also eliminates the danger of contamination that results from imperfectly burned fuel oil. This happened sometimes when our plant ran for long periods at full capacity on fuel oil."

Cites Other Advantages

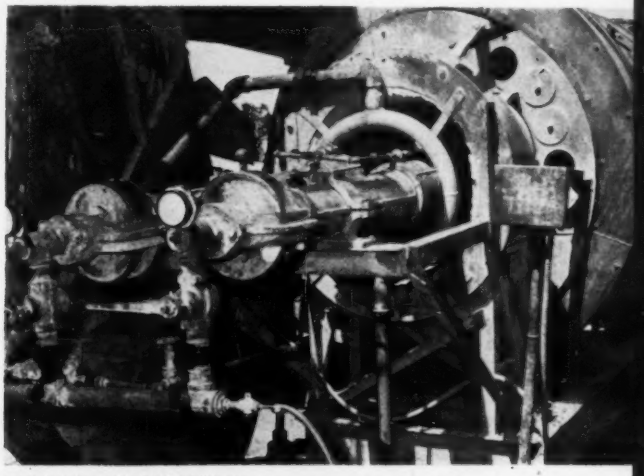
Freeto cites other benefits of the LPG system:

- It reduces the time required to get the plant in operation in the morning or after a temporary shut down. "In the morning, I start the plant only 30 min before the time to load our trucks," says plant superintendent Clifford Crowe. "With fuel oil, I had to start up from 45 to 60 min before loading time."
- The heaters used in the oil circulating system can operate on butane unattended, thus reducing labor costs. "When we used fuel oil in the heaters we had to keep a man to watch the oil burner and to shut the diesel fuel off if the burner went out," says Crowe. "We don't do that any more."
- When the oil burners were removed from the rotary dryer the need for a blower to supply air to the burners was eliminated. This change made the 10 hp usually needed to drive the blower available to the rest of the plant.

The butane vaporizer system installed on the rotary dryer of the Freeto plant was built and designed by the Hot-Mix Equipment and Fuel Co., who assisted in the installation of the unit. Asphalt plant conversions usually

continued on page 98

QUICK STARTER—Freeto plant superintendent Clifford Crowe adjusts butane flow into burners as he starts up plant's rotary dryer.



COMPACT INSTALLATION—Burners extend from left to combustion chamber. Tubing around burners is butane drying header.

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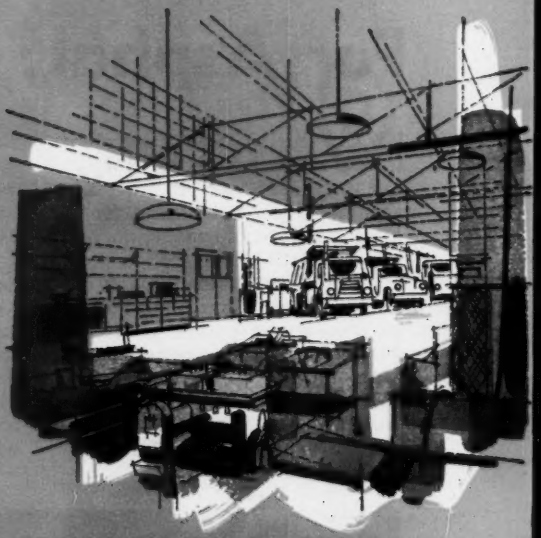

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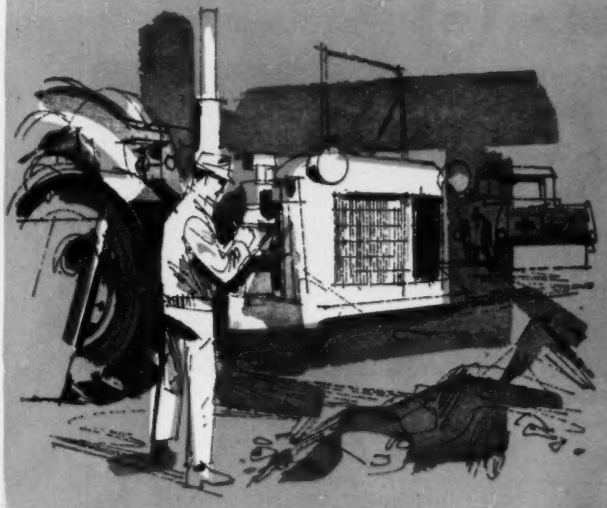

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CUMMINS **MORE PROFIT**

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LPG CUTS FUEL COSTS...
continued

include both the rotary dryer and the oil heater. In this case, however, Freeto had already installed a separate butane system for the oil heaters.

On the dryer, the two oil burners were replaced with two Webster butane burners rated at 25,000,000 btu's each. The Hot-Mix system consists of a vaporizer, butane drying header, pressure regulator, relief valves, and connecting lines. The vaporizer system and the Webster burners made a compact package that was mounted on a channel frame at the face of the rotary dryer's combustion chamber.

LPG ALL THE WAY—Freeto's Chevrolet tank truck uses propane-butane mixture as fuel for truck, for separate power plant mounted at rear, and for asphalt heaters.

Header Dries Butane

Butane from the storage tank first enters the vaporizer where its pressure is regulated from 15 to 30 lb, depending on the plant's requirements. Then it passes through the doughnut-shaped drying header that encircles the burners at the entrance to the combustion chamber. Dry butane then feeds into the burner. If the heater on the Freeto plant already had not been fired with separate butane units, another line from the drying header would have carried butane to the heater.

The volume of butane entering the burners is adjusted by valves on each burner, and pressure is controlled by a regulator. Relief valves on the vaporizer system are set at 125 to 250 lb on the line from the butane storage tank to the vaporizer and at 50 lb on the lines from the vaporizer to the drying header.

The Hot-Mix vaporizer system is designed to operate safely at temperatures as high as 1,100 deg and at pressures up to 250 psi. The plant gets fuel from a 6,000-gal tank, which Freeto owns, and from a 5,200-gal semi-trailer that was placed on the site by the butane supplier.

Previously, the rotary dryer consumed 2½ gal of diesel fuel per ton of processed material. Butane consumption has averaged about 3 gal per ton. But fuel oil costs Freeto as much as 12¢ per gal, and butane in this area is available at from 5 to 7¢ per gal. Thus, it takes about 20¢ a ton to operate the dryer with butane; fuel oil costs Freeto about 30¢ per ton. Contractors in other areas,

LIMA Roadpacker speeds freeway construction near Colfax, California

Proper consolidation plays a large part in the speed with which McCammon-Wunderlich Co. and Wunderlich Contracting Co., Palo Alto, California, are completing their $3,650,000 state freeway contract on U.S. 40 east of Colfax.

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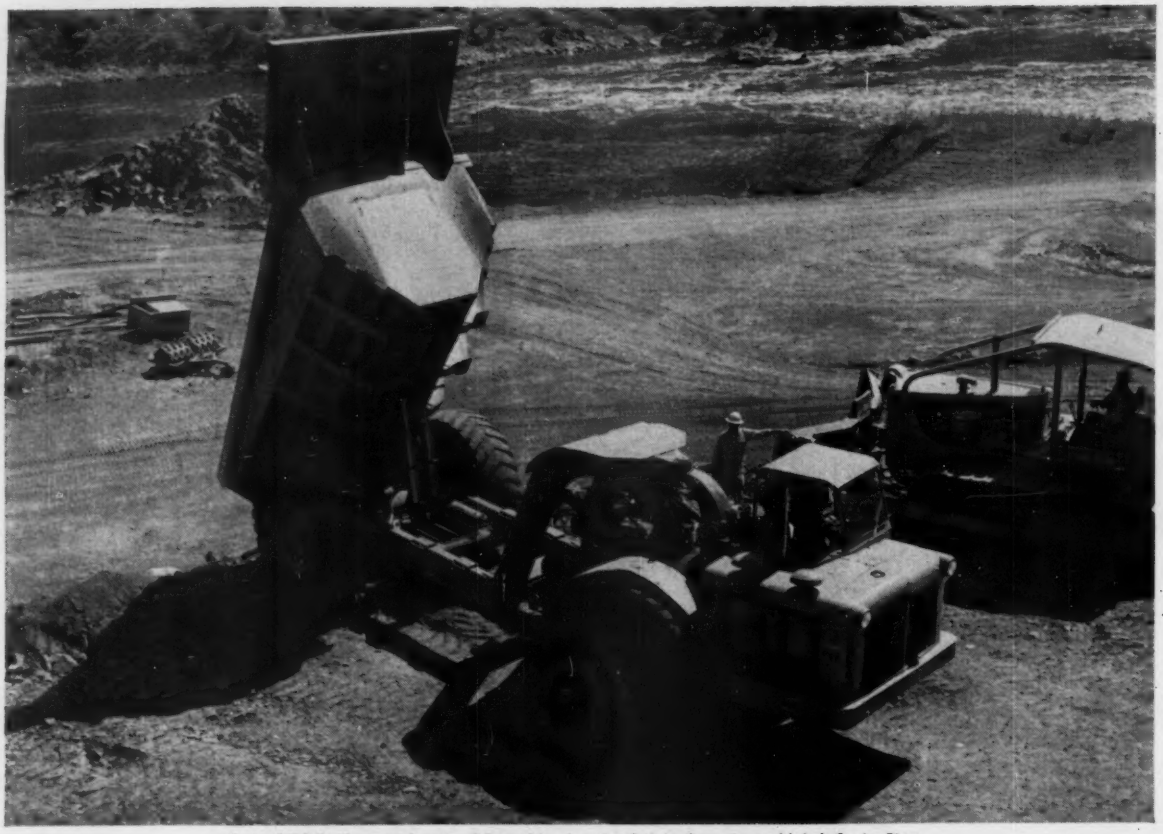

Euclid S-18 Earthmover dumping 35-yard load at the Oxbow Dam site on Idaho's Snake River.

Quick Hose Line Replacements Help Meet Schedules

Field Assembly of Aeroquip Hose and Fittings Gets Construction Equipment Back on the Job FAST!

Master Mechanic Ralph Ochletree (right) checks assembly of an Aeroquip Replacement Hose Line with a 180° elbow fitting.

These Aeroquip High Pressure Hydraulic Lines on an S-18 earthmover are made to withstand vibration and shock.

Tight schedules on big jobs like the Brownlee Power Project in Idaho require quick, sure equipment maintenance. Aeroquip Hose Lines are used for replacements by Morrison-Knudsen Company, Inc., contracting the Brownlee Project. M-K mechanics can assemble any hose line in minutes using Aeroquip Hose and Reusable Fittings. Downtime is held to a minimum and replacement cost is low.

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LPG CUTS FUEL COSTS...
continued

however, may find that relative costs are less favorable for butane. On a national average, diesel fuel is less expensive than LPG fuels.

Early last year, Freeto Asphalt and the Freeto Construction Co. converted 40 Chevrolet tank trucks to LPG. Twenty-five of these units have dual carburetion systems that allow them to operate on either LPG or gasoline. These conversions were made by Freeto personnel in Freeto's shops. Both Beam and Century carburetion systems were used, and each truck was equipped with a 50-gal LPG tank.

The conversions cost Freeto about $20,000, but the company claims it got back its original investment in 16 mo. Using a 60-40 mixture, propane to butane, Freeto has cut its fuel costs in half. Gasoline gave 20% more miles per gal, but LPG fuel costs Freeto 5½¢ per gal and gasoline costs them 13½¢ per gal.

Oil consumption and maintenance costs also have been reduced sharply. Oil was changed every 2,000 mi when the trucks were driven by gasoline; now oil is changed every 10,000 mi, and the oil at the end of this period is cleaner than it was previously. Before the LPG conversion, trucks were overhauled every 40,000 mi; with LPG, some trucks already have passed the 55,000-mi mark without an overhaul.

LPG fuel for the truck fleet is stored in one 3,000-gal and four 1,000-gal tanks. A service wagon consisting of a 1,200-gal tank mounted on a Chevrolet truck chassis accompanies the fleet into the field. In addition, Freeto owns 500 and 1,000-gal fuel tanks mounted on trailers to service trucks. These trailer units have their own vapor pumps that deliver 19 gpm.

The LPG installations on both the asphalt plant and the truck fleet were naturals for Freeto because of its location. In most other sections of the country, LPG is cheaper than gasoline or electricity, but more expensive than diesel fuel. But even if LPG does not offer fuel savings, it has other advantages that are worth looking into. LPG fuels cut down on objectional fumes and reduce maintenance requirements.

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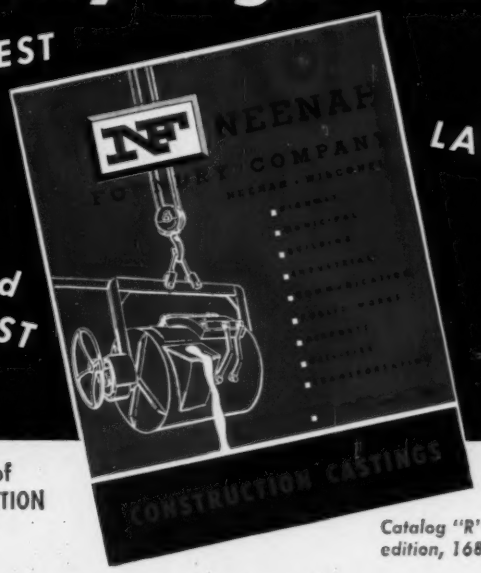

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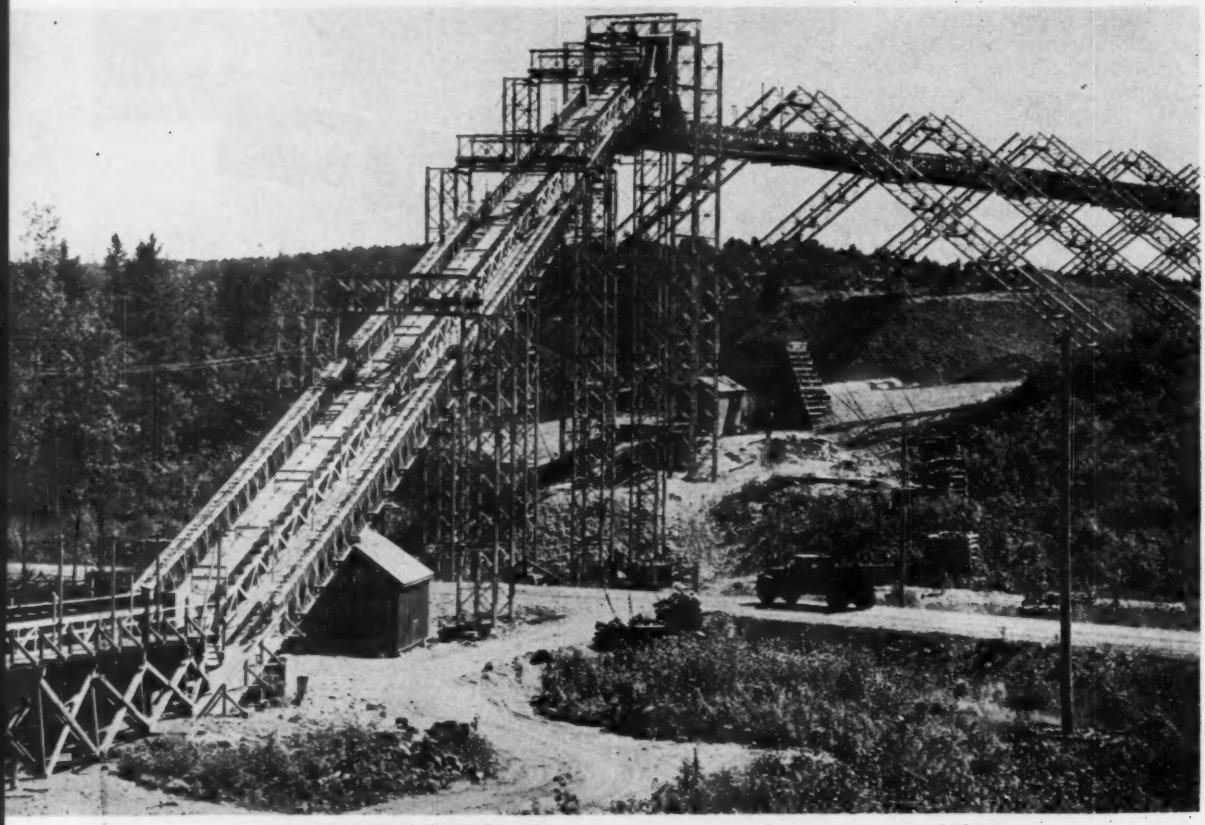
SPECIAL REPORT: Bailey Bridging

Second half of this special CM&E report tells how dambuilders have put Bailey bridging to work. It also includes a rundown on how to get Bailey components, what they cost.



AGGREGATE CONVEYOR—Conveyor carrying aggregate from pit rises over stockpiles on a Bailey structure, moves onto a horizontal Bailey bridge supported on Bailey A-frames.

Bailey Trusses Support Conveyors, Brace

By JAMES G. RIPLEY
Assistant Editor

A BIG DAM JOB offers a good chance for smart use of Bailey equipment because its construction plant requires heavy, though temporary, structures that are easy to ship to remote areas.

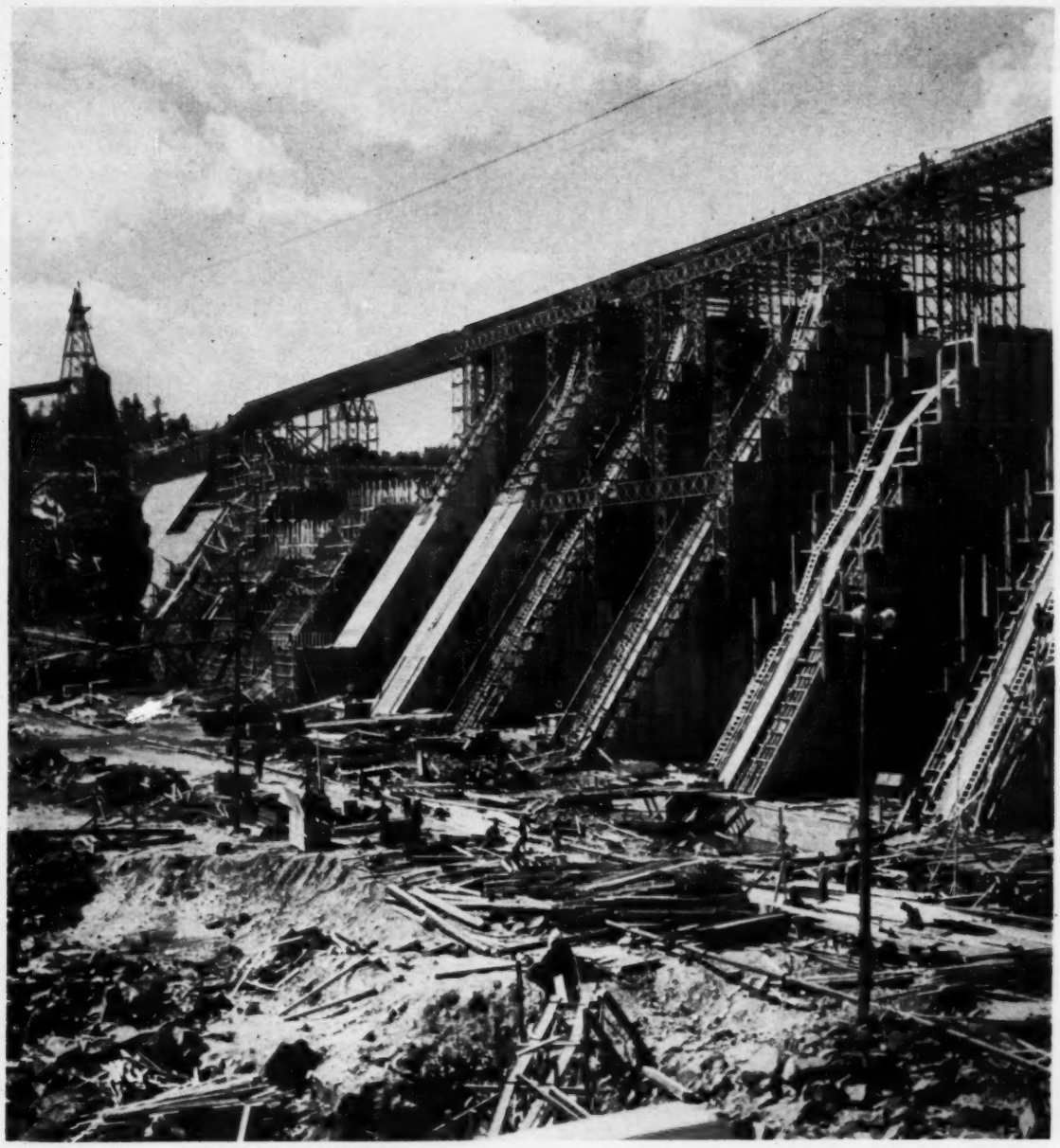
Canadian dambuilders especially have made extensive use of Bailey. One, the Ontario Hydro-Electric Power Commission, is the world's largest civilian user of Bailey material.

Hydro invested several million dollars after the war to buy 20,000 tons of Bailey bridging. They have used it on almost every dam they have built since the war, and it has paid for itself many times.

With the current price of Bailey several times what it was when Hydro made this investment, it is doubtful if any current builder will duplicate their program. But on a more limited scale Bailey can still save money on dam jobs.

Des Joachims Dam

On this job Hydro used the largest amount of Bailey equip-



CONCRETE CONVEYOR—Bailey bridge over dam carries concrete conveyors from plant to pouring area. Bailey trusses act as strongbacks to support formwork for high pours.

Forms, Frame Buildings

ment ever employed on a civilian job. A casual observer might have wondered whether they were building a dam or an exhibition of Bailey bridging.

Des Joachims is a $75-million, 480,000-hp. concrete dam, located 140 mi north of Ottawa, Ont., on the Ottawa River. The main dam is 2,400 ft long and 160 ft high.

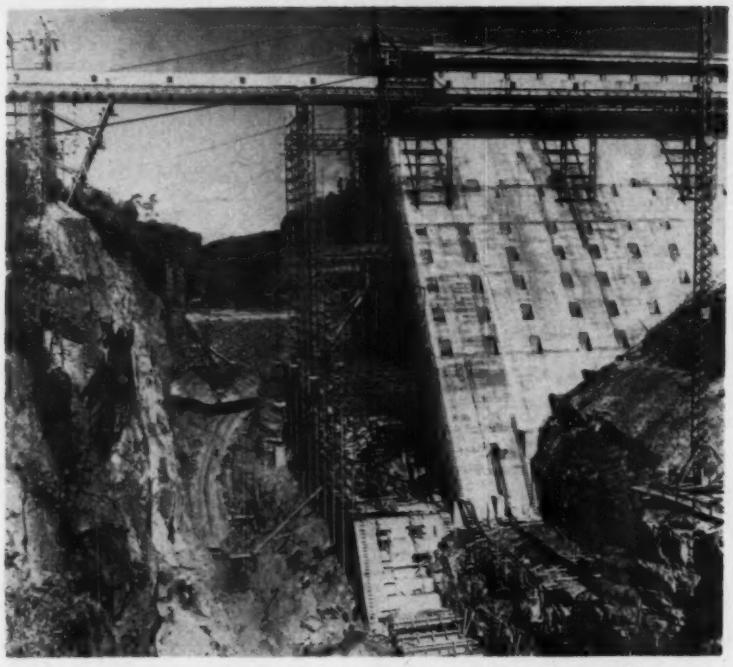
Hydro used 3,400 tons of Bailey equipment to build everything from formwork to temporary buildings. They also built some bridges—one main five-span access bridge on temporary concrete piers, plus several smaller ones.

But the most spectacular Bailey structure was the mile-long conveyor system for aggregate and concrete. Hydro found a good gravel pit less than a mile from the plant site, and they decided to bring the gravel to the plant on a conveyor.

They set up a series of A-frame bents, formed from double-single Bailey trusses. Under the peak of these bents they suspended a continuous Bailey bridge on ⅞-in. cables to carry the 30-in. conveyor over the stockpiles.

A second conveyor from concrete plant to dam was carried on series of regular Bailey spans. This section had two 30-in. belts that carried all the concrete

Baileys Speed Foreign Jobs



IN CANADA—Complex Bailey structure acts as formwork frame for high lift pours on hydro dam. Canadians find Bailey ideal for high pours, not as economical for low lifts.

IN SCOTLAND—Two giant stiffleg derricks move back and forth on Bailey platforms at Lednock Dam Project. Derricks handle concrete placing, can reach any point on the dam.

poured in the dam. Hydro had an 18-ton, 2,200-ft aerial cableway over the dam, but they kept this fully occupied with form placing and other erection chores.

Hydro used Bailey trusses as strongbacks for plywood forms on the high-lift pours (20-120 ft). But they did not find Bailey necessary or economical on low lifts.

To erect the portal gates Hydro put up a Bailey gantry bridge for a 75-ton crane. They also built several temporary buildings, including the dining hall, from Bailey material.

Other Hydro Dams

The Mississagi Dam, a $20-million project near Sudbury, Ont., involved some spectacular Bailey formwork. Hydro poured this gravity dam in 15 high-lift monolithic blocks.

To carry the massive formwork for these pours, Raynor Construction Co. of Toronto, Ont., contractors on the job, built a frame structure of Bailey trusses, the same size as the dam. Inside this cage they hung the plywood forms.

The White Dog Dam in northern Ontario currently is using Bailey form supports for 20- to 30-ft pours. A Bailey bridge across the top of the dam carries a 65-ton crane. And an unusual Bailey framework supports a 25,000-gal elevated water tower.

The 20,000 tons of Bailey equipment that Hydro bought after the war helped considerably to cut a big backlog of dam construction. Now that Hydro has caught up with its building program, it has sold much of its Bailey material and has only 9,000 tons left.

But for a while they were glad they had all they could get. "I don't know what we'd have done without it," says R. H. Dickson, design and planning engineer in Hydro's Construction Division.

Lednock Dam

Taylor-Woodrow Construction, Ltd., placed concrete for a dam at Glen Lednock, Scotland, with two electric-powered stiffleg derricks. They mounted each derrick on a Bailey gantry so they could move back and forth along the downstream side of the dam and reach any point on it.

Each gantry consisted of two girders, one for the derrick mast and a lighter one for the leg. They were box-shaped with two pairs of single-single trusses spaced 5 ft apart. The cross bracing was standard except for some bracing angles normally used for the Bailey suspension bridge. Special bolts connected the trusses for added rigidity.

American Dams

The main use for Bailey equipment on U. S. dams has been for access roads. Several contractors have bought it for this purpose.

The contractor at Trinity Dam in California erected an 80-ft, single-span bridge of 50-tons capacity across the Trinity River to move his equipment to the site. It was a single-lane job but used the American M-2 transoms to give it a few extra feet of roadway width.

continued on page 107

Here's why

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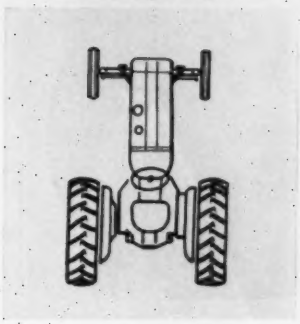

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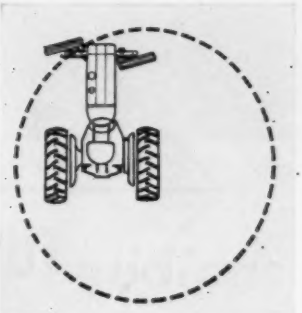

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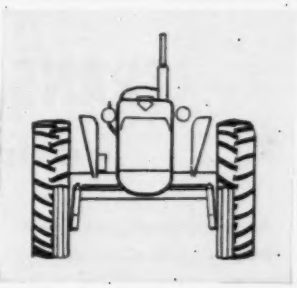

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WAREHOUSE—Bailey panels form arched trusses for Ontario Hydro warehouse in Toronto, Can. Each truss spans 163 ft, the width of the building. Twenty-six bays add up to a building length of 450 ft. Roof structure contains 208 tons of Bailey panels.

Bailey Roof Trusses Span Big Buildings

Bailey girders make good building trusses. Normally they are too expensive for permanent buildings, but they may be ideal for temporary structures where the parts can be re-used.

Hydro was the first outfit to use Bailey for buildings. They did it right after the war when they could not buy structural steel.

Using Bailey trusses for a framework, they added 20,000 sq ft. of badly needed office space to their headquarters building. Hydro employees refer to the two-story addition as "The Bailey Building."

Hydro also built several warehouses at their Toronto Islington yards. The biggest of these has 208 tons of Bailey steel in it. The Bailey roof arches span 163 ft.

Storage Building

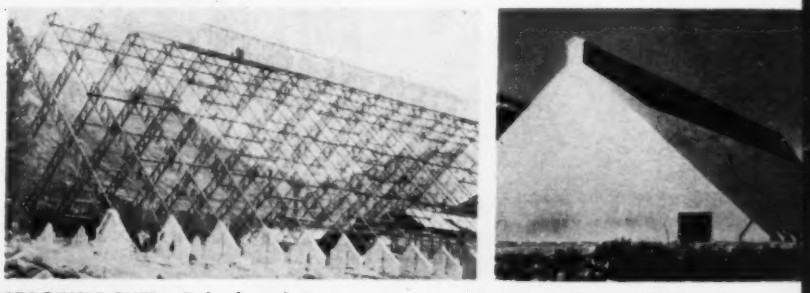
The Cassiar Asbestos Co., operating in a remote area of northern Canada, wanted winter protection for an ore stockpile. Materials for the structure had to come in overland at a cost of $100 per ton, and their vehicles could not handle loads longer than 20 ft. Because of these restrictions, Cassiar engineers decided that Bailey construction would be the most economical method.

The building was 480 ft long and 155 ft wide. In cross-section it was triangular and 70 ft high. Total ore capacity was 115,000 tons.

Cassiar formed each roof truss with two 100-ft-long Bailey girders. They spaced the trusses 16 ft apart and connected them with transoms. They connected the peak with specially fabricated triangular adapter pieces.

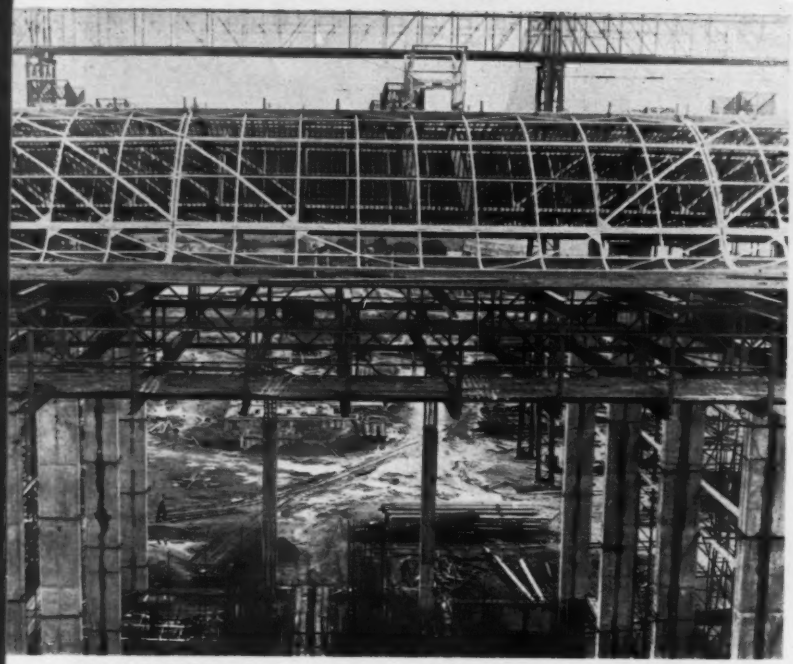
The end walls are framed with 10-in. H-beams on concrete footings. They are connected to the trusses with U-bolts that permit the trusses to slide against the columns as deflection occurs. The steel roof joists were specially fabricated for the job.

Crews assembled the girders on the ground. A truck crane and



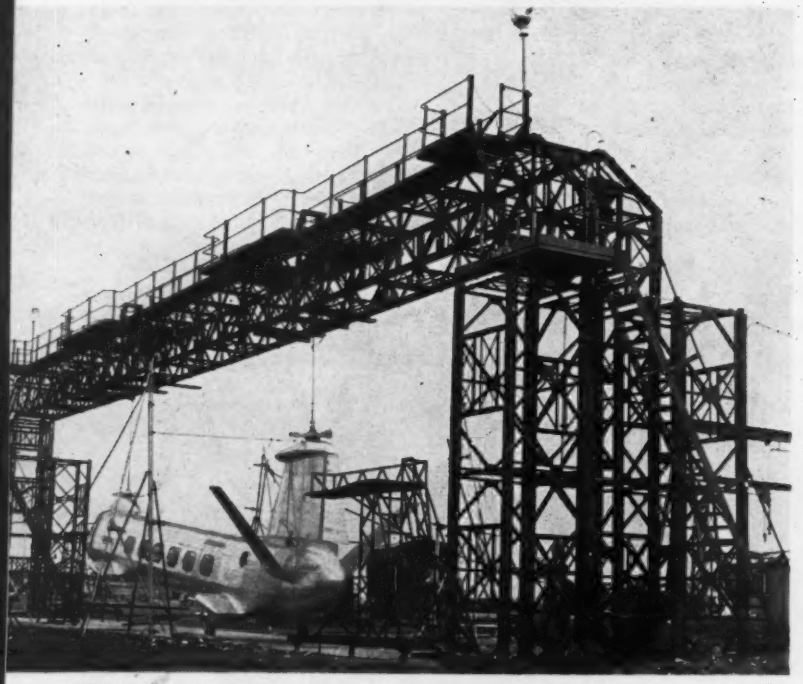
STOCKPILE SHED—Bailey-framed structure protects ore in northern Canada. Bailey was the cheapest structural material because of ease of transportation.

Baileys Form a Gantry . . .



ERECTION AID—Bailey bridge spanning width of power house building moves along rails to provide working platform for crews constructing a series of roof arches.

. . . and a Helicopter Test Frame



TEST RIG—Helicopter testing structure allows engineers to put helicopter through paces without flying it. Bailey structure can be expanded for future needs.

gin pole erected them. An addition to the building several years later was erected by a track-mounted jib that ran on rails along the top of the old building. With this jib Cassiar doubled their erection rate, putting up two trusses every 8 hr.

Marples, Ridgway & Partners, a British contractor, rigged a Bailey gantry to handle steel erection for a powerhouse.

The turbine house roof consisted of a series of concrete shell arches supported on tubular steel framing. The problem was to erect the framing while other trades were working underneath, without building up scaffolding from the floor.

The contractor designed the Bailey gantry to span the 70-ft building width. Mounted on carriages, it rode on permanent crane rails on the main columns, 62 ft above the floor.

A timber deck on the Bailey girders formed a working platform. The deck was stepped down on each side to fit the arch.

Four winches at the building corners moved the gantry from one arch to the next. Later the whole assembly moved to another building and repeated the erection.

Speed of erection and provision for enlargement were the main requirements of the Bristol Airplane Co., England, for a helicopter testing gantry.

They wanted a frame from which they could suspend helicopters to test rotor hubs without actually flying the machines. They wanted something that could be enlarged in the future. And they wanted it in a hurry.

Bailey equipment was immediately available and it was erected in a few days. The structure consisted of two 25-ft towers, spanned by a 110-ft Bailey girder, to form a rigid frame.

To keep the structure rigid the new expanding panel pin was used in all pin joints.

Bailey bridging entered the atomic age when it figured in the construction of the Shippingport Atomic Power Plant, the first full-scale commercial nuclear plant in the United States. Burns and Roe, Inc., who were acting as agent-constructor for the Du-

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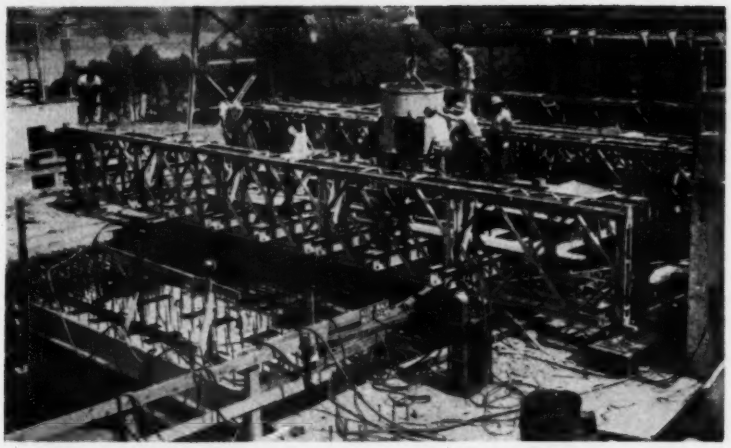

ATOMIC PLANT—At Shippingport Atomic Power Plant, Bailey bridging carries formwork below roof so that the 5-ft-thick slab can be poured without form support underneath.

quesne Light Company, used Bailey trusses to carry heavy formwork for some of the concrete roof structures.

The containment vessels at this plant are surrounded by a heavy concrete structure whose roof slab is 5-ft thick. Burns & Roe built most of this roof by first spanning the structure with 2-ft thick precast concrete sections, then using these slabs as forms and pouring the remaining 3-ft of concrete directly on top.

But where there were hatch openings or ductwork passing through the slab they had to pour the whole slab in place. The containers below could not support the weight of the 5-ft slab and formwork during the pour so the forms had to be supported from above.

On some of these special pours Burns & Roe supported the forms on 36-in. WF beams. On others they placed a double-single Bailey bridge across the area to be poured. They used regular transoms on the Bailey, but instead of flooring they laid 12x12-in. timbers longitudinally across the transoms. From these timbers they suspended the formwork on job-fabricated 1¼-in. hanger bolts. The bolts passed through the slab and were cut off when the formwork was removed.

To counteract the sag in the Bailey span when the concrete was placed, engineers took elevations of the top of the hanger bolts prior to pouring. During the pour they took up the sag by tightening the nuts on the hanger bolts to keep the tops of the bolts at a constant elevation.

continued on next page

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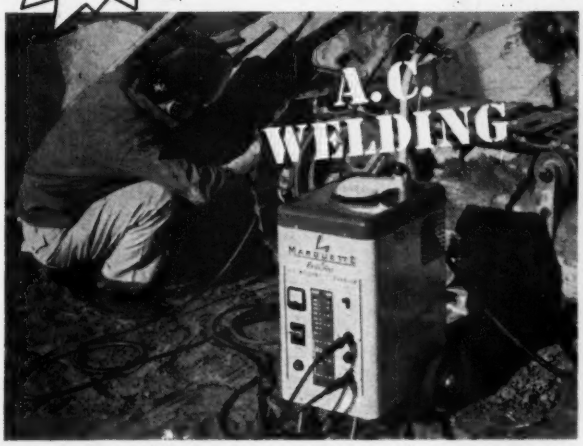

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Parts are Simple, Interchangeable

Bailey equipment is fabricated to close tolerances, and every piece is tested before it leaves the factory to insure interchangeability of parts.

Whenever possible, standard structural shapes are used. American manufacturers tailor U. S. shapes (by shearing the flanges for instance) so that they will match British parts. This makes all parts, wherever made, interchangeable.

Welded construction keeps weight to a minimum. Structural members are of high quality tensile steel, 50% stronger than normal structural steel. Panel pins are especially tough. They are made of nickel chrome molybdenum steel, heat treated to an ultimate strength of 112,000 psi.

The original Bailey design included only 24 different parts. These still are all that is needed to build any size bridge. But as the scope of Bailey construction expanded, more parts were added for specialized jobs. Now there are over 200 available.

In addition to these standard parts, big users often develop special parts for a particular job. Ontario Hydro has fabricated 600 different custom-made parts for specific adaptations.

Here are the basic components:

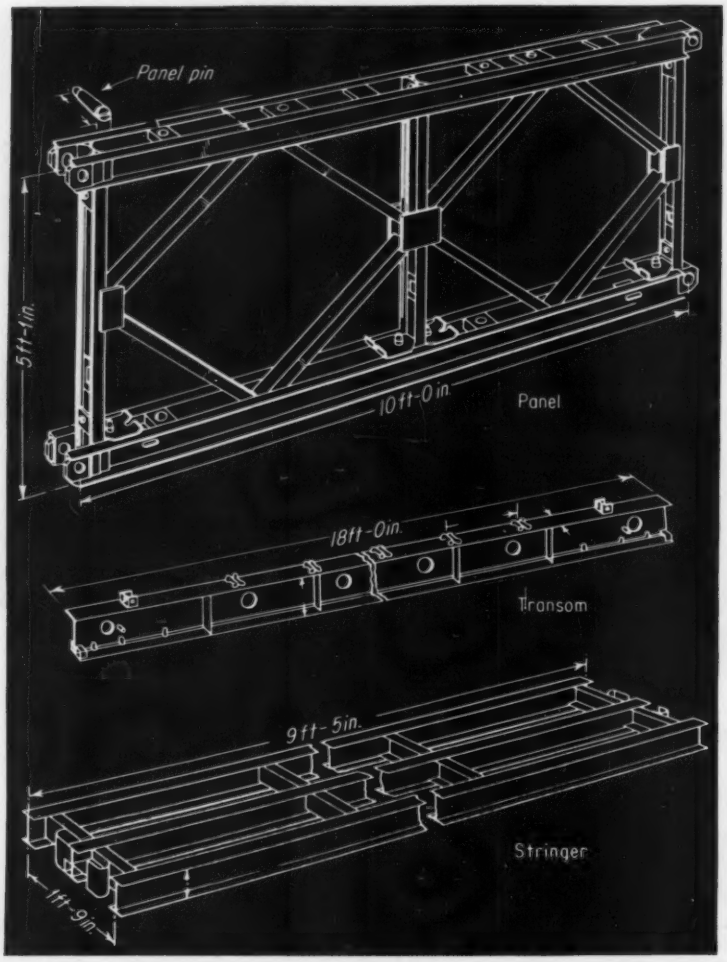
Panel—This 5x10-ft truss section has male lugs at one end and female lugs at the other for pin connection. Top and bottom chords are two 4-in. channels back to back. Bracing members are 3-in. I-sections. A panel weighs just under 600 lb.

Panel Pin—A small but important part, the pin is 8 in. long and 1⅞ in. in dia. It is tapered at one end for easy driving but the section that passes through the panel lugs is straight. The pin weighs 6 lb and can resist a double shear load of 160 tons.

Transom—The main cross beam, it varies in length from the original 18-ft British design to the 20-ft American M-2. It is a 10-in. WF-type sections weighs 450-500 lb, and is fastened to the bottom chords of the panels with hinged clamps.

Stringer—This is the main flooring unit, composed of three 4-in. I-beams welded together with stiffeners to form a frame. It goes across the transoms, longitudinally with the bridge.

Bracing Members—The "sway brace" is a hinged rod. Two of them span each bridge bay diagonally from the bottom corners of the panels. The "raker" is a short I-beam that connects the outer end of a transom with the top of the panel.



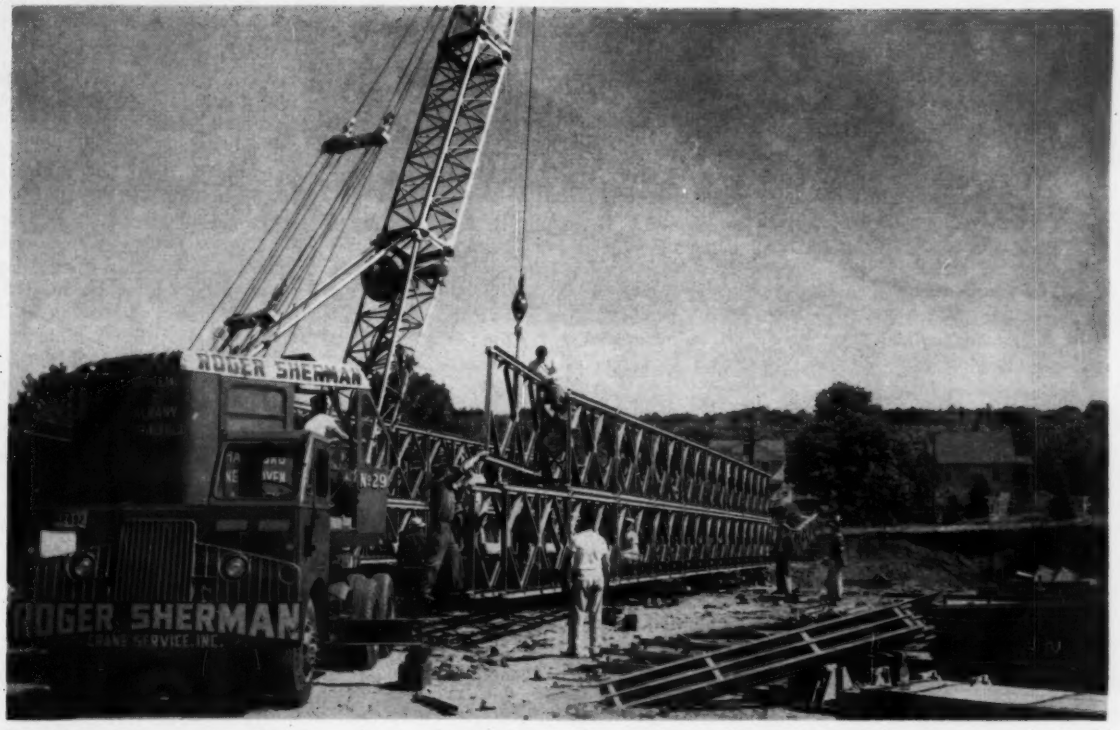
Erection

The cantilever method is the usual way to erect a Bailey bridge. A crew erects the bridge on one bank on a series of rollers. On the front end they attach a light "launching nose."

The launching nose is simply a single-single extension of the trusses. At the pin connections in the bottom chords a small piece called a "launching link" spreads the connection and points the truss slightly upward to overcome the natural sag of the bridge.

Workers—or a bulldozer—push the span out over the gap. The launching nose lands on rollers on the far side and the whole span follows. Then the launching nose is removed and the span jacked down onto bearings.

Sometimes, instead of pushing from behind, a crew will set up a winch on the other bank and pull the bridge across. Or, if bank space is limited, they may



ERECTION—Ten-man crew with light truck crane erects Bailey bridge at Torrington, Conn., during 1955 floods. Erection took less than one day. Civilian contractors find a 10-man crew about right for the average bridge. Army uses bigger crews, less machinery.

build the span on a barge and float it into place.

For light spans, especially over dry gaps, trusses are often assembled independently and lifted into the bridge in one piece by a crane.

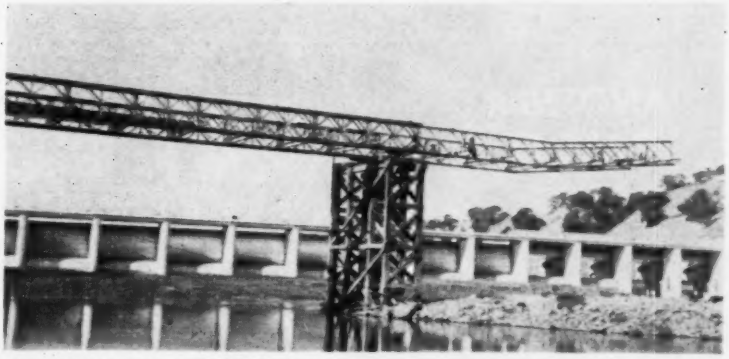
The Army usually puts up a bridge with manpower alone. The Bailey was designed for this role; no part weighs over 600 lb and no power tools are needed for connections. The Army uses anywhere from 40 to 100 men for the job.

This lavish use of manpower is out of the question for a civilian contractor; he invariably uses a crane. The Ontario Highway Department figures 10 men with one light truck crane as the most efficient bridge erection crew.

New Developments

The pin connections of a Bailey cause considerable sag in a bridge of any length, especially in single story construction. This does not affect the strength and usually is no problem. But sometimes a rigid structure is needed.

The recently developed "expanding panel pin" solves this problem. A slotted sleeve goes into the hole first. When the pin is driven home it expands the sleeve against the sides of the hole, eliminating clearance between pin and hole.



LAUNCHING—Standard launching technique uses cantilever principle. Bridge is built on one bank, pushed over gap on rollers. Launching nose counteracts sag in bridge.

Chord reinforcement is another recent addition. The extra unit simply doubles the depth of the main chords in a panel. This almost doubles the strength of the truss without adding much deadweight.

The Uniflote is the most recent addition, having reached the market just this year. It is a steel pontoon, 17 ft long, 8 ft wide, and with depths available from 4 to 8 ft. A big improvement over the old plywood pontoons for floating Bailey bridges, it can also be adapted for rafts, jetties, and carriers of floating equipment.

A steel deck system now available is more durable than the wood floor system for bridges under heavy traffic.

An aid to planning is the scale model set put out by the manufacturer. The parts are accurate down to the last detail and can duplicate any Bailey structure. Because it is so well made the set is almost prohibitively expensive, and it usually doesn't pay a contractor to buy a set for himself. But Bailey distributors use their own models to help contractors with Bailey designs for a specific situation.

continued on next page

Where to Get It

After World War II, the only source of Bailey equipment was Army surplus. Now an English company is producing new equipment specially for the civilian market. The marketing pattern is still a combination of the two sources, but supplies of surplus are now almost used up.

During World War II, about 650 companies in England produced 460,000 tons of Bailey equipment at a cost to the British government of 40-million pounds sterling. American companies, who started later, also turned out a lot of Bailey material although not as much as the British.

This enormous quantity of material, less what was destroyed in the war and what was retained by the military, became available to civilians in 1945. For five years it was the only source for contractors because none was manufactured during that time for the civilian market

In 1950, Thos. Storey (Engineers) Ltd., of Stockport, England, who had been one of the principal producers during the war, obtained an exclusive license to manufacture and distribute Bailey equipment to the world civilian market. Under this arrangement the British government still retains patent rights to the Bailey design.

Storey set up agencies around the world to handle distribution. In 1952, they appointed Contractors Service Limited, of Toronto, Canada, as principal distributor for North America. Contractors Service is part of the Canadian construction division of Merritt-Chapman & Scott Corp.

Contractors Service has four distributors in Canada. In 1955 they moved into the American market where they have distributors in Frankfort, Ky., San Luis Obispo, Calif., and South Portland, Me.

The organization maintains stocks of Bailey equipment at Toronto, Edmonton, Vancouver, and New York City. They generally can make delivery to any North American point within a week.

They sell both new and reconditioned equipment. The latter is Army surplus stock that has been sent back to the English factory for rebuilding. The work is done thoroughly, and all material is tested before leaving the factory. Only 50-80% of the equipment passes these tests and reaches the market. Reconditioned Bailey material is guaranteed by the manufacturer on the same basis as new equipment but usually sells for about 20% less.

Rental of Bailey material was a big business for a number of years but very little is rented today. The big reason is damage to the equipment. To pay for careless handling of rented material, a distributor has to charge a high percetnage of the purchase price. This worked satisfactorily when Bailey was selling for little more than scrap prices. But at today's prices, rental fees are prohibitive.

However, there still are a few independent distributors left who rent Army surplus Bailey, generally as a side-line service to cus-

continued on page 118

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You don't have to stand for high costs on those many "medium" jobs any more!

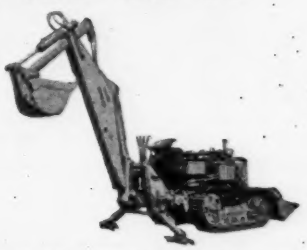
First, the Oliver OC-4 is the only crawler in its class offering diesel power. That means fuel standardization—you can save with diesel even in this popular tractor size!

Second, for all its compact, job-accessible size, the OC-4 performs like larger rigs. By nationally recognized tests, the OC-4 diesel out-powered, out-pulled and out-stepped all other crawlers its size!

Third, the OC-4 is the lowest priced diesel crawler you can buy—for substantial initial savings in addition to important year-after-year operating economies.

Alert users are profiting from the OC-4 by letting this capable crawler do all those jobs where it's uneconomic to tie up larger rigs and wasteful to use less efficient equipment. The OC-4 works with a wide range of front and rear attachments.

Talk to your Oliver distributor about the remarkable OC-4 now—gasoline or diesel models.



Doubly versatile the Oliver loader with Hydro-Jet Trencher. Deep 12'5" digging and rapid work cycle speed all back-hoe work. Trencher attaches and detaches in less than a minute! Also work the OC-4 with these attachments: dozer, angledozer, scarifier, winch, side boom, scraper, etc.

OLIVER **THE OLIVER CORPORATION**

Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio

a complete line of industrial wheel and crawler tractors and matched allied equipment

What makes Frazier-Davis one of the

- *completed $200 million of construction in 10 years*
- *owns 300 units of equipment*

AS HEAVY CONSTRUCTION contract awards continue at a rate that's 7% ahead of 1957, contractors are gearing up for increased work loads by using more productive techniques, equipment, and materials.

One of the nation's top contractors who is preparing for a bigger share of construction in the months and years ahead is the **FRAZIER-DAVIS Construction Company** of St. Louis, Missouri. Adrian W. Frazier, Chairman of the Board and E. C. Davis (retired) joined hands in 1916 to form the Frazier-Davis Construction Company. During the earliest years, they engaged primarily in sewer and railroad construction, highways and bridges. They set out to work out new methods of doing hazardous jobs that no other contractor would tackle. With this as their objective, they have achieved a national reputation in the field of heavy construction.

Through the years, Frazier-Davis expanded its operations to include a wider variety of construction such as bridges . . . sewers . . . dams . . . locks . . . power plants . . . viaducts . . . concrete pile dikes . . . pipelines . . . buildings . . . and tunnels. Half of this contractor's work is industrial, and the balance is divided between Federal, State, and Municipal governments.

Completed $125,000,000 of construction in 5 years

The scope of the Frazier-Davis operations and the big role of contractors in construction today is reflected in the figure above. This contractor averaged over $25 million of construction for a five year period. Most of this work has been done in the states of Missouri, Illinois, Pennsylvania, New Mexico, Arizona, California, Ohio and New York. This is indicative of the nomadic nature of contracting operations. Frazier-Davis projects are widely scattered through many states from coast to coast.

Works $1,500,000 worth of equipment and over 500 men

In addition to a permanent staff of forty, Frazier-Davis employs approximately 600 people at the peak of its operations. To handle the many types of construction projects which this contractor works on, a wide variety of construction machinery is owned and operated. Some of it is transported from project to project by railroad. Some of the 300 units of light and heavy equipment used by Frazier-Davis in producing $25,000,000 of construction in 1957 is shown below.

Frazier-Davis Equipment Inventory

(valued at $1,500,000)

- **7 Tournarockers**
- **3 tractors** — rubber-tired, crawler (Oliver, International)
- **14 trucks** — dump, pickup, stake (International, Chevrolet, Ford, Euclid)
- **41 pumps** — (Labour, Ingersoll-Rand, Rex, Byron Jackson, CMC)
- **12 compressors** — (Ingersoll-Rand, Gardner-Denver)
- **16 automobiles** — (Ford, Chevrolet, Oldsmobile, Cadillac)
- **46 buckets** — (Hendrix, Insley, Blaw-Knox, Pettibone-Mulliken, Williams, Page)
- **4 cranes** — (Northwest, Lorain)
- **6 buses (field offices)** — (GM, Twin City)
- **15 drills** — (Ingersoll-Rand)
- **1 generator set** — (GM)
- **2 hoppers** — (Gar-Bro)
- **1 steam cleaner** — (Jenny)
- **3 pile hammers** — (McKiernan-Terry)
- **14 hoists** — (Clyde, Waverly, Mundy, Wellman-Seaver, Morgan)
- **2 front-end-loaders** — (Eimco, Scoopmobile)
- **1 press** — 100 ton (Rodgers)
- **7 trailers**
- **5 welders** — (Hobart, Lincoln)
- **10 muckers** — (Eimco, Conway)
- **13 fans** — (Joy)
- **1 airplane** — (Cessna 195)
- **1 concrete batch & mixing plant** — (Johnson)
- **6 mine flat cars**
- **28 mine dump cars** — (Watt)
- **2 wagon drills** — (Ingersoll-Rand)
- **7 mine locomotives** — (Goodman, Plymouth, Eimco)
- **1 motor grader** — (Austin-Western)
- **3 concrete mixers** — (Ransome)
- **2 boilers**
- **4 shuttle cars** — (Joy)

Purchased $500,000 of new equipment in 1957

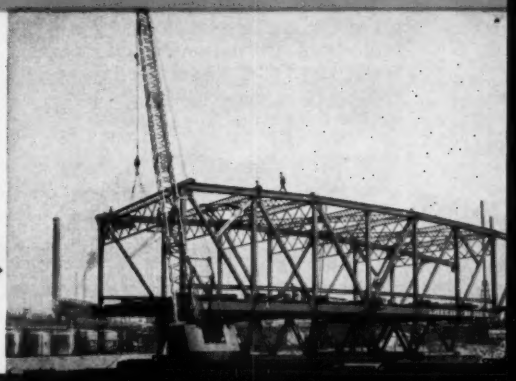
The need for new and improved equipment is ever-present in the heavy construction business. In 1957, Frazier-Davis invested $500,000 for new construction machinery of every description . . . from hoists, compressors, and hauling units, to drills, mining equipment, etc. This reflects the trend of expansion which is characteristic of contractor operations today. This is due in part to the rate of increase in contract awards which is exceeding the increase in the number of heavy construction contractors.

$10,000,000 worth of materials purchased in a year

The purchase and use of materials for construction and finished projects is a most significant aspect of every contractor's operation. A large proportion of Frazier-Davis'

$44 million Union Electric Power Station, St. Louis Missouri. Project required 1,400 heavy steel piles, 100' each; 36,000 cu yds of concrete, 9,000 tons of structural steel.

S. Park Avenue Bridge — Buffalo, N. Y. $3½ million project. A 220 ft. span, 100 ft. vertical lift. Deepest cofferdam — 65 ft. below ground. Required 1,500 tons of structural steel, 6,000 cu yds of concrete.



nation's top contractors?

• bought $10 million of materials in 1957

• bought $500,000 of equipment in 1957

Pictured above is George D. Frazier — President of Frazier-Davis Construction Co. A member of firm since 1939 and long-time subscriber to Construction Methods magazine.

expenses in 1957 included $10,000,000 of materials purchases. The largest portion of this expenditure was for steel, concrete, asphalt, and blasting materials. When one contractor spends $10 million in a year for materials, you get some measure of his size and importance to the industry and the economy as well.

Purchasing at Frazier-Davis a joint management function

The purchase of construction machinery and materials has a direct bearing on the contractor's net profit picture. As president George Frazier says...

"no one man can initiate and control all purchases of equipment and materials. Our top executive and management personnel (project mgrs., supts., foremen) influence and initiate the purchase of equipment and materials. On large and highly calculated purchases our top executives sometimes make final decisions, jointly or individually after considering all recommendations."

Important contractors like Frazier-Davis must keep abreast of what's new and important in the industry. How CONSTRUCTION METHODS magazine meets this need is told by George Frazier who says...

"This is an excellent magazine. The descriptive job stories are well-written and presented. I'm particularly interested in the fine editorial coverage of new construction techniques and how equipment is used on different projects. Looking over the ads is also an important part of my reading. We're always on the lookout for new ideas, equipment and techniques."

Adrian Frazier, Chairman of the Board and a CM&E reader since 1927 says...

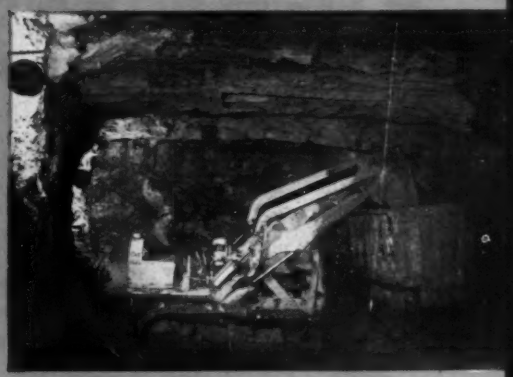
"I read Construction Methods because it keeps me abreast of new methods in the construction industry as well as keeping me abreast of new developments in equipment. I feel that the reading of Construction Methods is so important that we make sure all our key personnel subscribe to it."

Ed Kersting, Vice President of Frazier-Davis says...

"Construction Methods offers us many valuable ideas and techniques which we have applied in our construction operations. We clip out articles pertaining to new techniques and file them in scrapbooks by subject. This system enables us to solve many specific problems in different types of construction."

The progressive policies of Frazier-Davis and the careful selection of top executive and management personnel have contributed in great measure to its success. A total of 21 top management and key personnel in Frazier-Davis subscribe to CONSTRUCTION METHODS AND EQUIPMENT.

Glen Canyon Dam—$10,000,000 diversion of Colorado River. Construction of two 20 ft. diversion tunnels 6,000 ft. long, and 26 ft. tunnel, 10,000 ft. long. One of 8 Tournarockers and Tournapulls used on project.



Sinking of 12 ft. by 22 ft. sloping shaft for National Gypsum Co. Construction of 2,000 ft. long shaft required use of Caterpillar Traxcavator HT4 shovel to load a Watt five cubic yd. side-dump car during mucking operations.

Men like George D. Frazier, President of Frazier-Davis and the other key personnel in this top contracting firm are astute business men, open-minded and on the lookout for machinery, materials and techniques that will improve operations and increase profits. To reach and sell this important contractor market, concentrate your advertising in CONSTRUCTION METHODS... the contractor magazine. You'll contact regularly over 46,000 key men in construction, including 13,250 top contracting firms.

Construction Methods AND EQUIPMENT

A McGRAW HILL PUBLICATION

330 WEST 42nd ST., NEW YORK 36, N.Y.

ABC ABP

BAILEY BRIDGING . . . continued from page 114

tomers. One such company is the Portable Bridge and Equipment Co. of Houston, Tex. But even they do not consider Bailey rental a profitable business and it forms only a small part of their line.

Portable Bridge Co. concentrates on light bridging for pipeline construction work. For this, they find Bailey too heavy. They prefer other prefab bridges like the American Treadway. But for long spans they use Bailey.

It is almost impossible to buy Army surplus now. The Army is more likely to be buying Bailey than selling it.

For a time, big owners like Ontario Hydro and Dominion Bridge Co. were selling off their own surplus supplies. Now even they are down to a minimum stock.

Costs

The cost of Bailey equipment varies with the source and the situation. Although there are list prices for new parts, most purchases are negotiated according to what sort of package and service the buyer wants. But there are some guides.

Wartime production costs were about 12¢ per lb. Immediately after the war the government was selling surplus for as little as 4¢ per lb. As the market got tighter, the price of used material climbed to 10-20¢ per lb.

The price of new equipment now is about 28¢ per lb. Factory reconditioned parts go for about 20% loss. Army surplus, when it is available, is still less.

Rental prices vary with the selling price. Contractors Service estimates that they have to charge 10% per month of the selling price to cover wear and tear.

Bailey bridging is more expensive than regular fabricated structural steel. It is rarely economical for one-shot use. Its big cost advantage is that it can be re-used many times. Only if it is regarded as capital equipment, and its high initial cost written off over several jobs, does it become really economical.

Transportation costs vary. Contractors Service estimates 1¢ per ton-mile by boat, 5¢ per ton mile by rail. If a contractor can wait a few weeks, it usually pays to have the material shipped directly from England. Delivery takes about two weeks on the East Coast, six weeks on the West Coast.

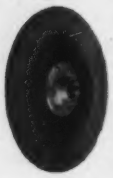
The Ontario Highway Department, for estimating purposes, uses a flat figure of 10¢ per ton-mile to cover transportation. This is a conservative average that includes both short hauls and expensive truck hauls.

Ontario Highway engineers put erection costs of a bridge at 1¢ per lb for routine jobs, about double that for tough erections. These are also conservative figures and often erection costs less.

Future

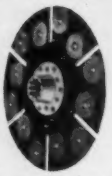
The Bailey faces some tough competition in the years ahead as ingenious designers and new materials, like aluminum, combine to develop new products. Some day the Bailey will be obsolete. But that won't happen soon. There are 250,000 tons of Bailey equipment on civilian projects today, and more is on the way. As long as it is available, contractors will be coming up with new ways to use it.

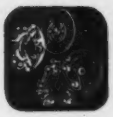
ROCKFORD



Morlife® whole-ring, powdered-metal-base, clutch plate facing provides smooth, powerful, non-scoring friction contact for heavy-duty operation.

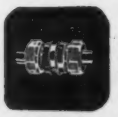
Morlife® button-type, ceramic-and-metal clutch plate facing provides powerful torque grip for use in off-highway, heavy-duty machines.





Small Spring Loaded

Heavy Duty Spring Loaded



Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

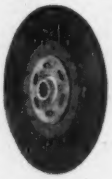
Speed Reducers

How You Can Get the RIGHT FACING For Your Clutches

ROCKFORD CLUTCHES are made with a wide variety of friction plates—to meet your specific needs, exactly. Powdered-metal, ceramic-and-metal, metalic and organic facings provide the *right* torque, wear and heat-disbursal characteristics for every type clutch. Because ROCKFORD engineers have this wide range of facings available, they can help you select just the right friction material to suit your need.

Solid-ring or segmented, metal clutch plate facings provide for use in machines where metal-to-metal friction contact is indicated.

An extensive variety of organic friction facings for all types of clutch plates is available for use with ROCKFORD clutches.

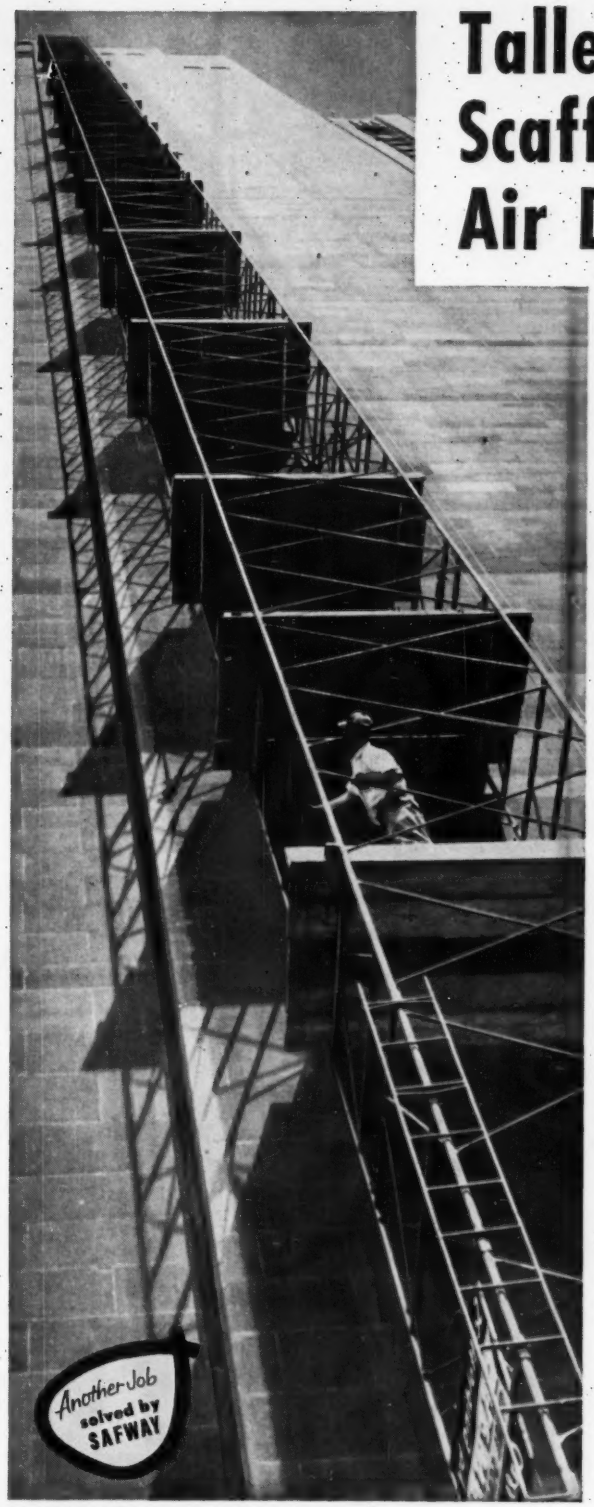


BW SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER
1331 Eighteenth Ave., Rockford, Ill., U.S.A.
Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

Tallest 5′ x 7′ Safway Scaffold Saves 50% on Air Duct Installation



WORKERS GET AROUND FASTER AND SAFER ON 342-FT. TOWER

AIR CONDITIONING the 34-story Koppers Building in Pittsburgh, Pa., required cutting holes at 12 different heights in a blank masonry wall—50 ft. laterally from the nearest windows. Each opening was a two-day operation.

O. H. Martin Associates, general contractors, believed that only a swing scaffold could handle this job . . . despite the considerable time and hazards involved in getting to and from working locations.

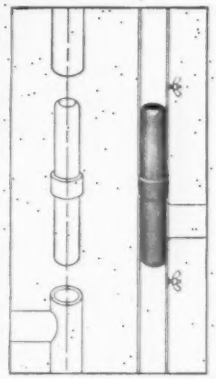
To eliminate these problems, a 342-ft. built-up steel scaffold was engineered by the local Safway dealer. Many advantages resulted:

"Our cost for cutting the holes, including the Safway scaffolding, was less than 50% of that for a swing scaffold," testifies General Superintendent W. A. Kennedy. The final saving was even greater. Several holes required alterations in size and location, and the accessibility of the Safway steel scaffold made these changes simple.

SAFWAY LOAD CAPACITY DUE TO PRECISION FIT AND RIGID DESIGN

Although only 5 x 7 ft. in area from base to top, this Safway tower carried a load of about 3,000 lbs. per leg with complete safety. Such capacity results from the strong, rigid design and precision fit of Safway parts. The photo (*left*) shows how the assembled scaffold frames line up perfectly to form continuous 342-ft. tubular steel legs of unbroken accuracy.

Safway scaffold frames are joined vertically with simple "coupling pins" (*see diagram at right*). With a clearance maintained at just 1/32 in., these pins slide smoothly into tubular legs of the frames below and above . . . providing a snug fit that assures accuracy and rigidity in assembled scaffolds.



By minimizing "play" in individual couplings, Safway scaffolds reduce overall or cumulative error and thus can safely support heavy loads at great heights.

Ask for **ENGINEERING HELP AND FREE CATALOG**

Ask your experienced Safway dealer for scaffold planning and erection service. Ample stocks are available for sale or rental. And write direct to Safway for your copy of **BULLETIN 111.**

SAFWAY
STEEL PRODUCTS, INC.
6243 W. State St., Milwaukee 13, Wis.

Pans do 1-mile hauling stretch in 6 minutes, round trip . . .

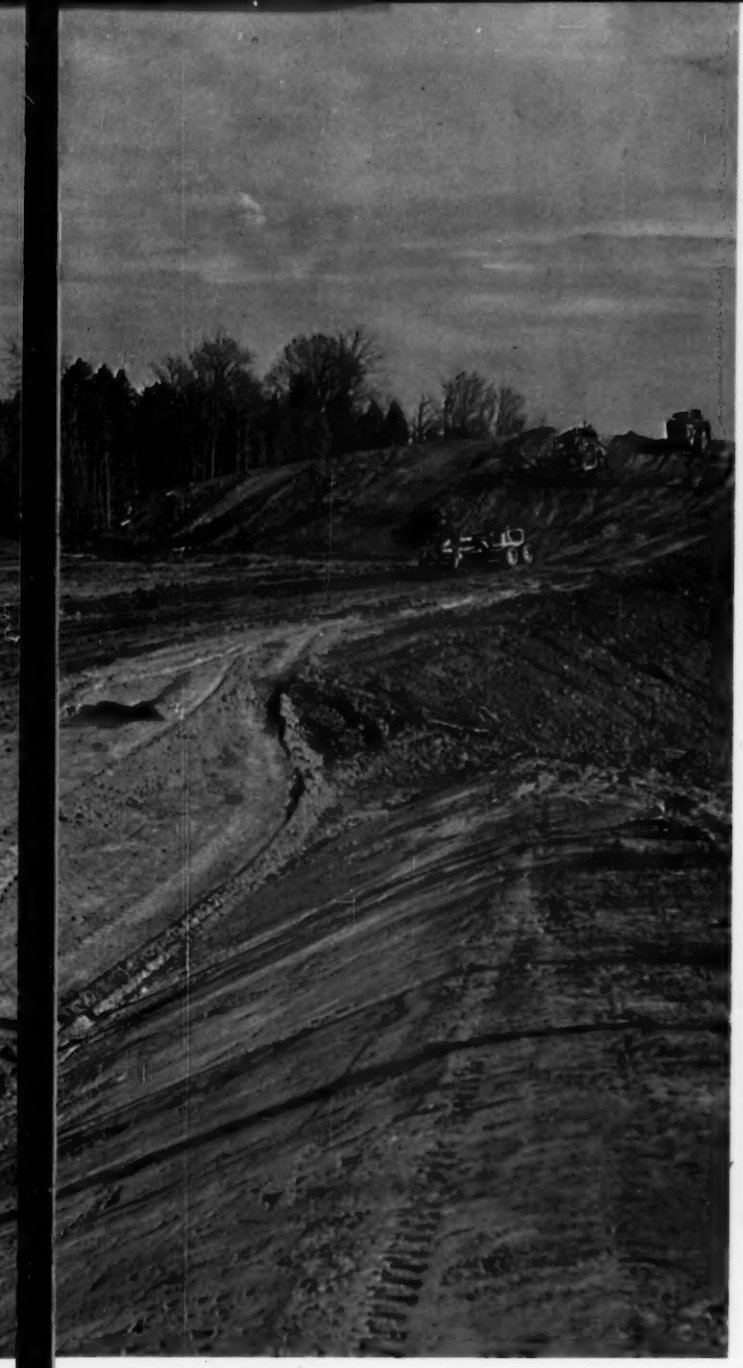
GULF MAKES THINGS

Malcolm and Benjamin Blankenship of Charlotte, North Carolina, set an almost unbelievable pace in earth-moving on a recent job, with Gulf fuels and lubricants in their power equipment. And they can tell you—Gulf makes things run better.

The job? Clearing, grading, drainage and bridge building on a 4.6 mile section of U.S. Route 29, from the Catawba River to the Charlotte bypass. On a tight schedule, they moved 1,132,000 cubic yards of material.

The pace? Take pan trip time. At one location, only 6 minutes, *round trip,* over a 1 mile hauling stretch. Pans averaged 20 miles an hour. Excavation volume? Over 10,000 cubic yards a day.

How did they do it? They used modern equipment, serviced it properly, and depended on Gulf fuels and lubricants for smooth, dependable operation. As Ben Blankenship says: "Earth moving pans do a bigger day's work with good fuel and lubrication."



Gulf teams up with the Blankenships. Left to right: W. C. Ritchie, Gulf Sales Representative; Roy G. Burkhalter, Sr., Gulf Sales Representative; Banks Massey, General Superintendent, Blankenship Brothers; Benjamin M. Blankenship, Partner; Mike Blankenship (son of Ben) on machine.

Ready to roll—on Gulf quality fuels and lubricants. Blankenship equipment on this job included 9 pans, 3 sheepfoot rollers, 3 motor graders, 3 dozers, 3 push cats, and 1 back hoe. In fair weather or foul, if the State Engineer said, "It's a work day"—Blankenship equipment rolled continuously!

RUN BETTER!

Senior partner Malcolm Blankenship adds: "We credit Gulf with helping to keep our equipment moving at relatively high speeds—in all kinds of weather—and getting maximum output from every machine."

How about *your* operation? Gulf can make things run better on your jobs, too. Ask a Gulf Sales Engineer. Just call your nearest Gulf office. Meanwhile, mail coupon for revised edition of "Contractors' Guide," the lubrication and maintenance manual for heavy equipment.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

☐ Please send me the free "Contractors' Guide"

☐ Send free booklet "Gulf and Your Business."

Name_____
Title_____
Company_____
Street_____
City_____ Zone____ State_____

SP-9310

PRECAST SEAT BEAMS SPEED COMPLETION OF BALL PARK

Seat beams were anchored by welding plates on seat undersides to plates on grade beams. 1082 seat beams were required.

Weighing approximately 1800 lbs. apiece, they ranged in width from 2'8" to 3' and in length from 13' to 14'.

Contractor for Structure:
Troy B. Hood, Inc.
Spokane, Wash.

Contractor for Excavation, Foundation and Tunnels:
Henry George & Sons
Spokane, Wash.

Manufacturer of Precast Units:
Spokane Concrete Pipe Co.
Spokane, Wash.

Ready-Mix Concrete:
Central Pre-Mix Concrete Co.
Spokane, Wash.

Architect and Engineer:
Culler, Gale, Martell & Norrie
Spokane, Wash.

Joint Owners:
City of Spokane
Spokane County

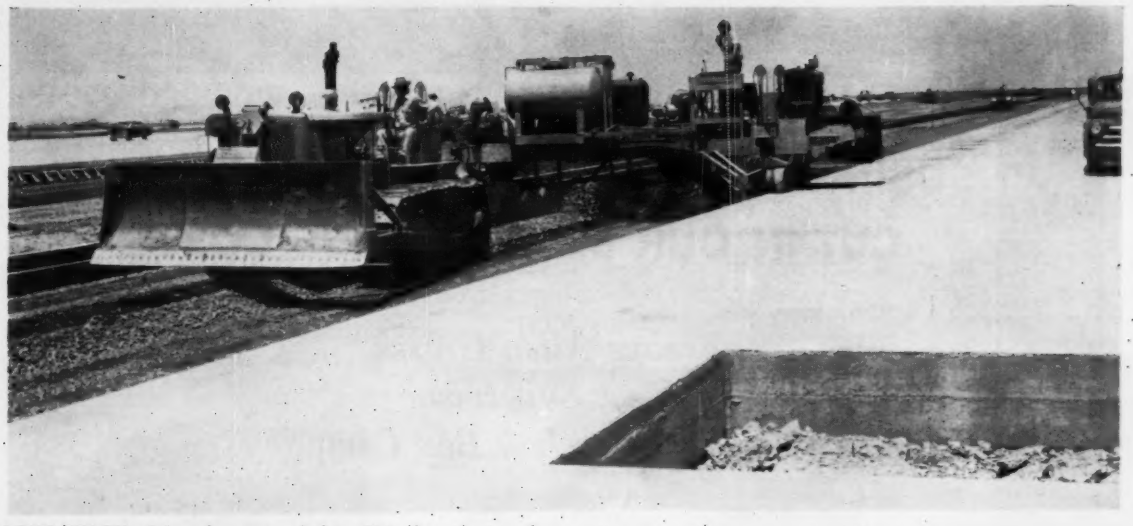
● Structural work on the new Fairground Park baseball stadium for the "Spokane Indians" did not get underway until February, 1958, yet the job had to be completed by the season's opener on April 29th. This need for fast work, without sacrifice of economy or quality, led to the choice of precast concrete seat beams for this job.

Using Lehigh Early Strength Cement, the manufacturer turned out 44 seat beam sections every day, from 550 lineal ft. of forms. Without the use of High Early Strength concrete, at least double the quantity of forms would have been needed to meet the tight schedule.

This is typical of the advantages of Lehigh Early Strength Cement in modern concrete construction.

With modern construction methods and Lehigh Early Strength Cement, the manufacturer was able to complete casting of the beams for this 8500-seat baseball stadium in less than 5 weeks.

LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PA.



LONG REACH—Subgrader can reach down 30 in. from the top of the forms and grade base-course rock to within ¼ in. tolerance. Twin augers at each side remove excess material for discharge over conveyor belts. Operating in reverse, they fill in low spots in base.

New Subgrader Clears Way For Record Paving Spread

One reason paving crews at Beale Air Force Base have placed as much as 7,900 cu yd of concrete in a 14-hr day is a subgrader built especially for airfield work.

A SUBGRADER that can reach down 30 in. from the top of the forms to fine-grade a base course in a single pass is one reason runway paving hit record rates at Beale Air Force Base in California.

Paving crews there placed as much as 7,900 cu yd of runway concrete in one 14-hr day. Their average production was well above 5,500 cu yd a day (CM&E, Feb. p. 132).

The new Deep-Cut Subgrader, developed by Standard Steel Co. of Los Angeles, Calif., especially for heavy-duty airfield runway work, was a key unit on the job.

It travels at an average speed of about 50 fpm, grading 1½-in.-minus base-course rock to a tolerance of ¼ in. On the Beale AFB job, a Cat D8 pulls it.

Twin augers are mounted at 45-deg angles at each side of the machine. They bring excess subgrade material up to a rubber conveyor belt that can discharge the material on either side of the machine.

To fill in low spots, the rig's operator turns off the augers and allows material to pile up in front of the blade, then reverses the augers (individually or together) to fill in the low grade.

Adjusting screws at each of the four corners of the machine raise or lower the rig to grade at any desired depth up to 30 in. It can grade lanes from 10 ft to 25 ft wide, and the operator can adjust the depth of the cut while the machine is in motion.

There are three controls on the machine. Two control the reversible augers; the third operates a hydraulic piston that raises or lowers cables to adjust for varying grades.

A principal advantage is that use of the Standard Steel subgrader substantially reduces the time between setting forms and pouring concrete. On the Beale AFB job, the time lapse between setting forms and pouring runway concrete was as little as 30 min in some instances.

General contractor on the $10.3-million Beale AFB job is a joint venture sponsored by R. A. Westbrook, Inc., and including Morrison-Knudsen Co., Inc., and H. Earl Parker, Inc.

Lefever Trucking Co. of Sacramento was the subcontractor for all subgrading work. Mel Kelso was Lefever's superintendent.

"USING FORD HEAVIES HAS MADE A BIG CUT IN OUR MAINTENANCE COSTS"

says Allen Grosse
Fleet Supervisor
Green Bay Box Company

Handling heavy loads with ease, this Ford C-1000 used by the Green Bay Paper and Pulp Company (an affiliate of the Green Bay Box Co.) grosses 60,000 lb. It is equipped with 260-hp 477-cu. in. Super Duty V-8, Extra Heavy Duty 5-Speed transmission and 6.50 to 1 rear axle ratio.

GO FORD-WARD for Savings, Style and Stamina!

Whatever your job . . . wherever you do it—you'll find Ford Heavies and Extra Heavies are engineered and built to do it better! And the '59 improvements in these models will bring still more benefits to your operation.

Greater operating economy with new, faster rear axle ratios and wide choice of transmissions.

More efficient parking brake of the internal expanding type has approximately 50% greater stopping and holding ability, requires less than half the operating effort needed for the previously used type.

Higher payloads and longer life with new, higher-capacity front and rear axle options.

Factory installed tractor package custom-fitted to Ford trucks for safer, more dependable braking.

Yes, the new '59 Ford trucks are here to take you *Ford*-ward for savings, *Ford*-ward for modern style and stamina. See your Ford Dealer today!

"Our records show that our average monthly parts cost, including major overhauls, has been reduced over 24%.

"Our Fords have given us less trouble than any other make of truck we've owned! Also, our Ford Dealer has always given us immediate and very good service. We've never had any downtime waiting for parts. They're always available at our Ford Dealer's, so we don't have the problem or expense of carrying a big parts inventory.

"Our drivers sure like the 'hillability' of the big Ford Tilts with their Super Duty V-8 engines! They say the 'Big V' has sure got it for power that seems to level out the steepest hills. And the Tilt Cabs are tops for maneuverability and riding ease.

"Performance plus economy . . . that's why we're sold on Ford trucks. We started using Fords when we opened our trucking department in 1954, and today 28 of our 35 trucks are Fords."

New Styleside pickups! Notice the handsome new grille, dual headlights, stronger wrap-around bumper. 6½-, 8- and 9-ft. boxes available in Styleside or Flareside models. Short Stroke Six or V-8 engines.

FORD TRUCKS COST LESS

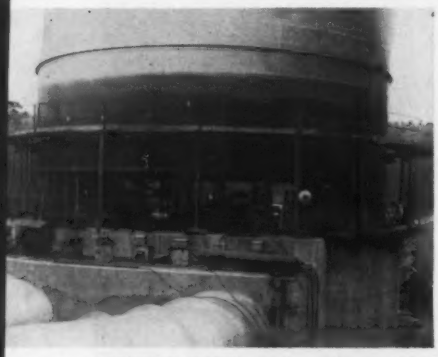
LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

ASSEMBLING EQUIPMENT—Jacks are connected over base of tank in three banks of four jack assemblies. These stand two stories high evenly spaced around base perimeter.

Jacks Erect Tower In One-Story Lifts

START AT THE TOP and work down—that sounds like a novel way to build a steel surge tank, but it's just the way many of them are being built in Australia.

The technique is inexpensive, permits using semi-skilled labor, and requires relatively simple equipment. Basically, the method involves fabricating the top ring of steel plates for the tank tower, raising the ring into the air, then adding subsequent rings fabricated at ground level.



JACKING TANK—Jacks push completed rings up 7 ft while next ring is set.

PLACING PLATES—Monorail and hoist on tubular scaffolds raise steel plates.

A typical tank that demonstrates the method is one Humes, Ltd., of Melbourne, developers of the system, recently completed for the Hydro Electric Commission of Tasmania. This tank has a 55-ft dia and stands 132 ft high.

Humes first poured a concrete base 114 ft in dia and 18 ft high. Over the base the contractor placed 12 rectangular structural steel jacking frames and jack assemblies. Each stood two stories high. They were evenly spaced around the perimeter of the base. Each jack was fitted with dual rack and pawls to guard against sudden movements of more than 1 in.

Jacks were connected in three banks of four jack assemblies. A pressure pump supplied water and soluble oil. Pressure gages that tested to 600-psi were installed at each jack and at the central panel of the system. Three main valves controlled the lifting process; a stop valve and a bypass valve controlled flow at each jack.

The contractor bridged each bank of four-jack assemblies with a pair of parallel lifting beams, designed to connect to the inside of the ring of steel plates that were to be raised.

A two-story hexagonal structural steel frame inside the tank supported both jacks and plates and also guarded against lateral wind forces during lifting operations. The frame was braced in the plane of each face leaving the entire central area of the tank base clear for working. Lifting beams rested on the banks of jacks and extended outside the framework.

A monorail supported on tubular pipe scaffolds placed outside the tank perimeter carried a painter's walkway and a movable hoist that raised and placed steel plates during fabrication of the tower rings.

Working at ground level, the contractor raised a plate by the monorail-mounted hoist and secured it from the inside to the jacking beams. Plates designed for the tank's top rings were ⅜ in. thick; those for the bottom rings were 15/16 in. thick. Once raised into position, plates were butt welded together. Their edges previously had been machined for butt welding, sand blasted and coated with a plastic paint.

Once a ring was fully fabricated and securely locked to the lifting beams, raising began. Jacks were actuated, pushing the ring upwards for a rise of 7 ft. While jacks held the top ring suspended, the contractor assembled and welded a second ring to the bottom of the top ring. Jacks then were retracted bringing the two completed rings to rest on the concrete base.

Lifting beams then were released from the top ring and secured to the ring second from the top. The two rings again were raised, and a third ring was welded to the bottom edge of the ring second from the top. This basic operation was repeated until the tank reached its full height.

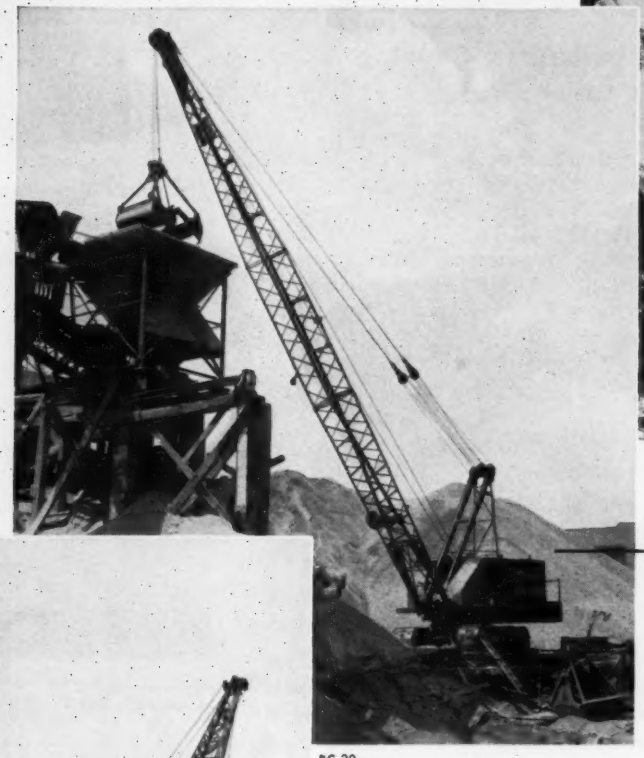
Three calibrated scales inside the tank maintained a structural level of within 1 in. during raising. A tolerance of ¼-in. was required for the completed structure. Once raised, supporting framework and jacks were removed leaving the tank self supported by its steel plates.

Main advantage of the method, according to Humes officials, was that all jacking and assembly was done at ground level permitting better quality welding with less-than-expert craftsmen. And, since each ring was a repeat of a previous one, erection time was short.

These engine users save money with Allis-Chalmers low maintenance...

24 engines average over 5,000 hours before overhaul

Allis-Chalmers engines in 24 trucks hauling ore at a large western copper mine average over 5,000 hours of operation before overhaul. Many have given more than 20,000 hours of service and are still "going strong."



BC-20

Has gone 7,000 to 8,000 hours since overhaul

The Allis-Chalmers 6DC1879 in this Bucyrus-Erie dragline at an eastern plant has had but one overhaul since it was new in 1949, and has gone another 7,000 to 8,000 hours since then. It keeps a fleet of about 40 trucks moving at about 10-minute intervals.

No repairs in 6,000 hours

This Koehring dragline works 10 to 24 hours a day for its Louisiana owner. It is powered by an Allis-Chalmers 1879 that has had no repairing since it was new, over 6,000 hours. The operator reports, "I haven't had a minute of downtime."

...you can, too!

One reason Allis-Chalmers engines *earn* more, *save* more is because they are on the job *working* more of the time.

Their rugged, simple construction results in a minimum of maintenance. Parts are fewer and stronger — that means less wear, less that can go wrong.

"Clean," simple design naturally means easier servicing, too. And you are always close to fast parts and service, wherever you are. Result: Allis-Chalmers engines are back to work quickly. See your dealer for the full story of Allis-Chalmers' dependability and economy. Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

(Advertisement)

3 top contractors tell how Transite Sewer Pipe helped keep installation costs low on the Allegheny County Sanitary Authority sewage project (Allegheny County, Pa.)

"Transite saved us considerable labor especially when we were working in 18- to 28-foot trenches . . ."

says W. R. Davies, W. R. Davies Company
Pittsburgh, Pennsylvania

"For the Allegheny County Sanitary Authority we used Transite Pipe for Sanitary Sewers because it is faster to install, lighter, and more readily handled than the other materials specified as alternates. Transite saved us considerable labor especially when we were working in 18- to 28-foot trenches.

"Another part of our 'Authority' contract included the installation of 5,300 feet of Domestic Water and Fire lines at the 150 MGD capacity Pittsburgh Sewage Treatment Plant. We used Transite Pressure Pipe for this entire job. Our costs were low because it is faster to install."

W. R. Davies Co. installation.

"In a remarkably short time, our men installed two miles of Transite . . . even though they worked below the adjacent river level . . . and between railroad tracks and one of the most congested highways in the county . . ."

says P. A. Benintend, Ben Construction Company
Pittsburgh, Pennsylvania

"For the Allegheny County Sanitary Authority Contract, Transite's ease of installation . . . sure coupling . . . and 13-foot lengths saved money for us in over-all installation. In a remarkably short time, our men installed two miles of Transite Sewer Pipe and force mains, even though they worked below the adjacent river level to install the force main—and between railroad tracks and one of the most congested highways in the county to install the sewer. Speed of installation plus prompt delivery enabled us to finish the job well before the required completion date."

"We installed Transite Sewer Pipe in some of the toughest locations on this job."

says D. C. Rothey, Project Manager
Harrison Construction Company
Pittsburgh, Pennsylvania

"In our stretch down along the Allegheny River we were constantly 5 to 14 feet below normal pool stage level. Final inspection revealed no infiltration."

Transite Sewer Pipe installations on the $100-million Allegheny County Sanitary Authority Project. Shown here is part of Harrison Construction Co. contract.

Ben Construction Co. installation.

How TRANSITE PIPE answers your two most important problems in sewer installation and operation!

In installation, your big problem is time. For the longer it takes to complete a "tight" installation the more it costs . . . the more annoying the problem of torn-up, detoured streets. And this is where Transite® pays its way in time-saving alone. Its lightweight, long lengths and quickly, *surely* assembled Ring-Tite® Coupling speed every step of installation.

In operation, infiltration and root-clogging can be even more costly. But they're problems that Transite's Ring-Tite® Coupling was designed to solve. Rubber sealing rings, tightly compressed between sleeve and pipe, give you a tight, long-lasting joint that locks out roots . . . seals out unwanted ground water.

Let us send you booklet TR-165A. Address Johns-Manville, CM Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

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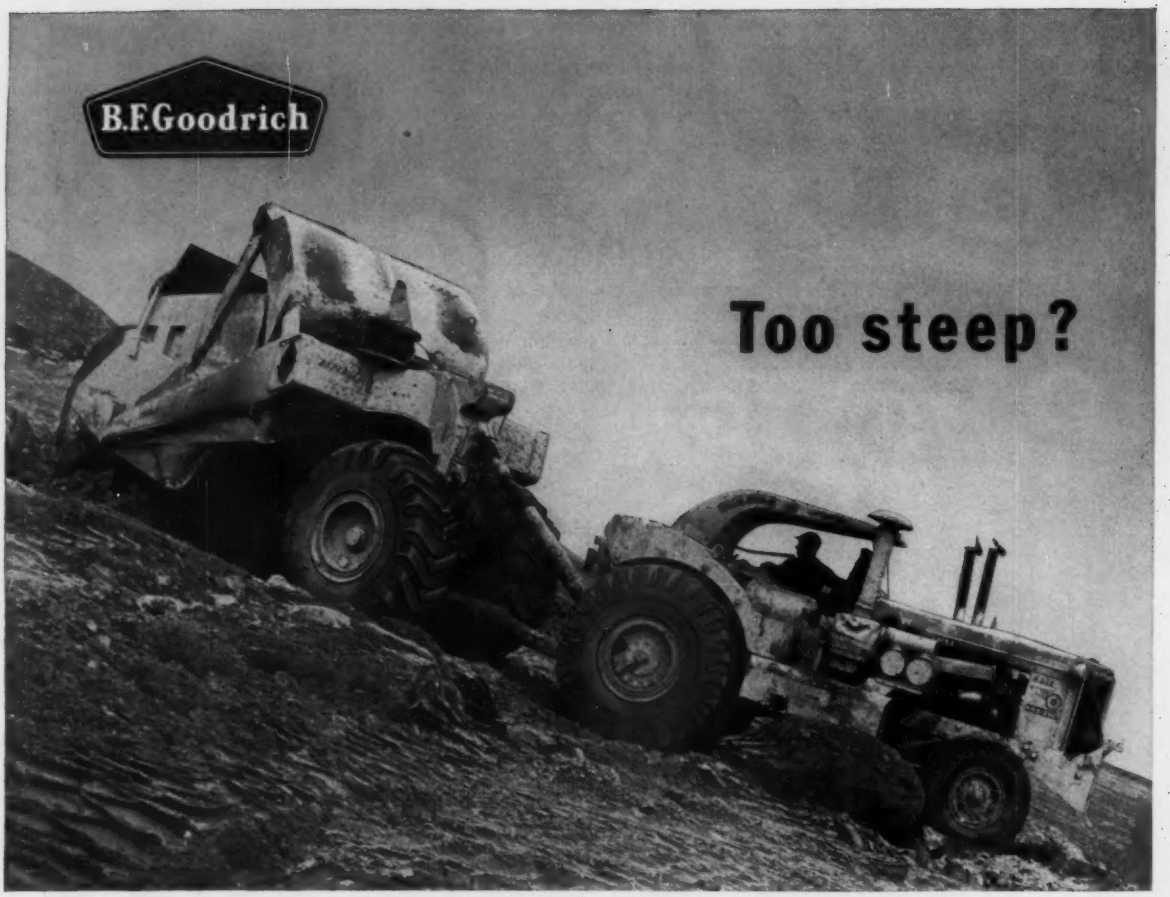


Not for B. F. Goodrich Hi-Torque Brakes

On a grade like this, chances are the operator of a tractor-scraper combination could not depend on conventional brakes for most efficient spreading control. With B.F.Goodrich Hi-Torque Brakes, down hill spreads can be accurately placed and controlled for proper depth.

B.F.Goodrich Hi-Torque Brakes also allow the operator to work faster—and with greater safety—even on terrain that was formerly considered unsafe. With B.F.Goodrich Hi-Torque Brakes the operator can *stop twice as fast* as he can with conventional brakes, and with no fear of brake fade.

The secret of this vastly superior performance is *full circle stopping power.* This exclusive design provides more lining contact area and more constant lining pressure than any other drum brake. Hi-Torque Brakes require no lubrication and have an automatic adjusting feature which eliminates maintenance throughout lining life. Lining changes can be made with standard hand tools.

Next time you buy dump trucks, tractor-scrapers or other wheeled off-road vehicles, be sure to *specify* B.F.Goodrich Hi-Torque Brakes. You'll not only reduce cycle time, you'll cut expensive maintenance, too.

Ask your equipment manufacturer for information. Or write: *B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Troy, Ohio.*

B.F.Goodrich ***Hi-Torque brakes***

Crews Switch Bridge Spans In Midstream

MOVING IN—Barges float in 2,000-ton lift span from fabricating point 1-mi downstream. Other barges have just removed old span.

IT TOOK JUST NINE HOURS for the Dominion Structural Steel Co. of Montreal, Que., Can., to remove a 220-ft low level bridge span and replace it with a new lift span. The contract had allowed them 22 hr to do the job.

The span is part of the combination railway-highway Valleyfield Bridge over the Beauharnois Canal near Montreal. This canal will become part of the St. Lawrence Seaway.

At 8:35 am a New York Central Railroad train rolled across the bridge. Immediately afterwards, crews from Quebec Hydro, who were handling marine activities, and Dominion, who built the new span, tore up the rails, cut the roadways, and moved partially submerged barges in under the span.

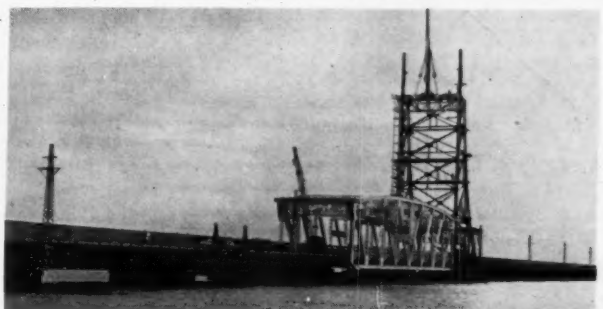
By 10:25 they had pumped out the barges, floated the old span, and towed it away. An hour later they had the 2,000-ton new span in position alongside the bridge. They had towed it on barges upstream 1 mi from the shore site where it was fabricated.

The trickiest part of the whole job was to jockey the new span into position against a strong current. But by 1:15 pm the new span was inside the line of the bridge and by 2 pm the crews had submerged the barges so that the span settled onto its supports.

By 4 pm the railway tracks were in place and precast concrete slabs had been laid in the highway section. Shortly thereafter, road and rail traffic started rolling across the bridge.

The 190-ft towers, which will lift the span in 90 sec, will be completed in time for the Seaway opening in 1959.

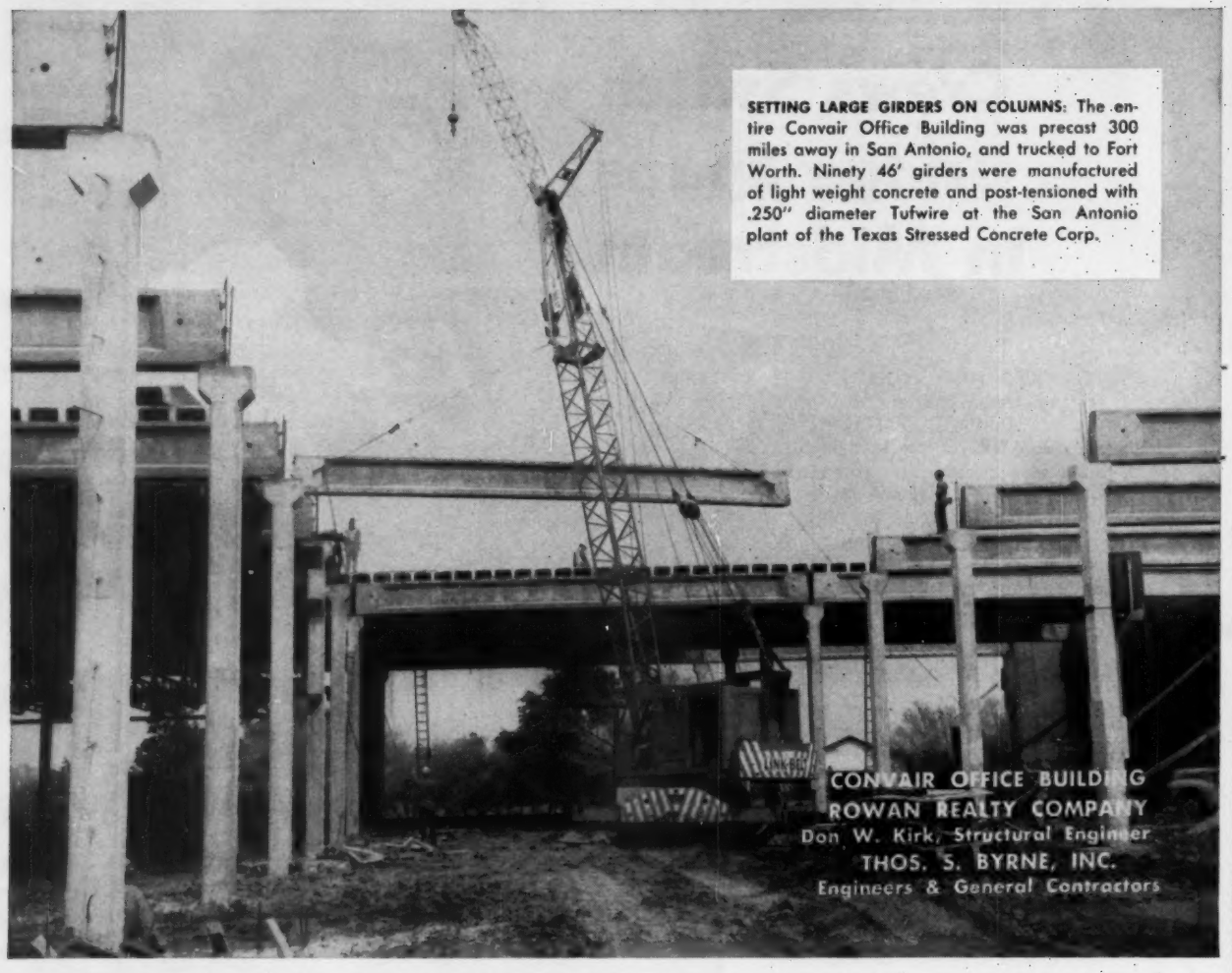
LINING UP—Crews jockey the span into position. A strong current makes this part of the job tricky. It takes just over an hour to move span from here to final position.



IN PLACE—With span properly lined up, crews flood the barges and span settles onto its support. Final job is to lay precast pavement on road.

(Advertisement)

Prestressed Concrete Building



SETTING LARGE GIRDERS ON COLUMNS: The entire Convair Office Building was precast 300 miles away in San Antonio, and trucked to Fort Worth. Ninety 46' girders were manufactured of light weight concrete and post-tensioned with .250" diameter Tufwire at the San Antonio plant of the Texas Stressed Concrete Corp.

Products Manufacture and Erection: Texas Stressed Concrete Corporation, San Antonio, Texas

Completed in 4 Months — Despite Record Rains

The rains came. For 22 days the construction business in Fort Worth, Texas, slogged through a deluge that meant delays ranging from slow-downs to shut-downs. You can't pour concrete in the rain.

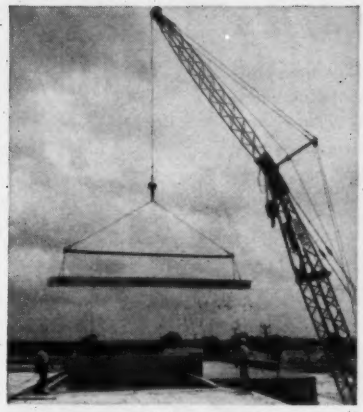
In the midst of this, an outstanding advantage of prestressed concrete construction was dramatically demonstrated — speed of erection even under adverse conditions.

The 102,000 sq. ft. Convair office building and warehouse is the case in point. The prestressed concrete structural members were erected in 13 working days — rain or no rain. The building was complete—offices, air-conditioning and all — in less than four months.

Speed of erecting is only one of many advantages that make prestressed concrete the miracle building material. Others are: great strength-to-weight ratio; less concrete needed; greater recovery after overloads; thinner sections; on schedule transportability of prestressed members; longer spans; permanence of concrete PLUS amazing flexibility and elimination of cracking; adaptability as unlimited as the imaginations of architects and engineers. Today, prestressed concrete is being used in a range of applications from fence posts to giant bridges and multi-story buildings; from movable parking lot curbs to airport runways.

Advances in the development of better high tensile strand and wire by Union Wire Rope Corporation have contributed heavily to the booming trend to prestressed construction. Once the problem of dependable tensioning materials was whipped, the way was opened wide for the "new age of concrete."

Erected In Only 13 Days



CLOSE-UP OF DOUBLE TEE BEING SET: Tuffy Slings were used as shown in placing 920 of these 4' double tee slabs. Slabs were made from lightweight concrete using Union Wire Rope "Tufwire" strand.

BUILDING ALMOST CLOSED IN: Work progresses steadily in the dreary rain as another double tee is hoisted into position. The roof structure was designed for parking. It was given a thick asphalt wearing surface.

LAST OF THE DOUBLE TEES ARE HOISTED FROM TRUCK completing roof for asphalt surface.

How Will You Share in Vast New Markets Opening For Prestressed Concrete Makers?

Looking for a new route of expansion? Want to get in on an industry that's expanding at a tremendous pace every year, with a future of fantastic dimensions? Prestressing offers opportunities not only to the on-site contractor, but also to the contractor who would like to operate a permanent casting yard as an arm of his business or as a commercial fabricator. Here are some of the opportunities:

OPPORTUNITIES in Buildings: Structures of just about every description are being built better with prestressed concrete. Office buildings, garages, warehouses, schools, motels, hospitals. Now the walls of multi-storied buildings are being poured in big slabs with openings for doors and windows, then tilted up to position. Floors are poured in "layers" separated by greased paper, then raised to upper floor levels.

OPPORTUNITIES in Bridges: The tremendous National Highway Program now under way calls for 300,000 bridges, most of which can be built much faster and more economically with prestressed concrete than with any competitive building material. Other bridges ranging from a small creek crossing to the world's longest highway bridge are built of prestressed concrete.

OPPORTUNITIES in Highways: Prestressed concrete pavement is already in the advanced experimental stage. The slabs need be only 5 inches thick, as contrasted with the ordinary 10-inch slabs used on many highways. They promise high levels of strength and permanence, speed of construction, savings in time and money. And more profit for suppliers and contractors.

These are just a few of the many uses where concrete prestressed with Union Tufwire strand and wire is proving its structural and economic advantages. Almost anything that concrete will do — it will do better when prestressed with Union Tufwire.

If you're a present user of prestressed concrete, or engaged in making it, let our engineering department and research laboratory give you and your consulting engineers a lift with any prestressing project.

If you're among those who see the big opportunity for a new plant to supply your area, let us help you explore the possibilities.

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Stress-Relieved Wire and Strand

Send Now for your FREE Copy of this digest of PRESTRESSED CONCRETE ADVANTAGES from data supplied by a panel of prestressed fabricators

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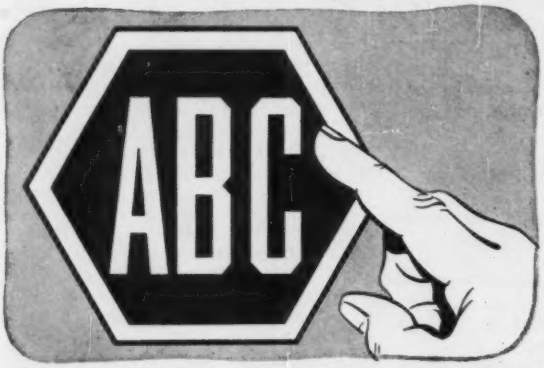
. . . in the magazine publishing business, it's

The Audit Bureau of Circulations (ABC) is a cooperative organization that sets standards of good business conduct for its publisher members. Once each year ABC auditors carefully scrutinize the entire circulation structure and operation of every member magazine. In a very real sense, therefore, they are "minding the store" — making sure that no false or misleading claims are made regarding the size or composition of a magazine's audience.



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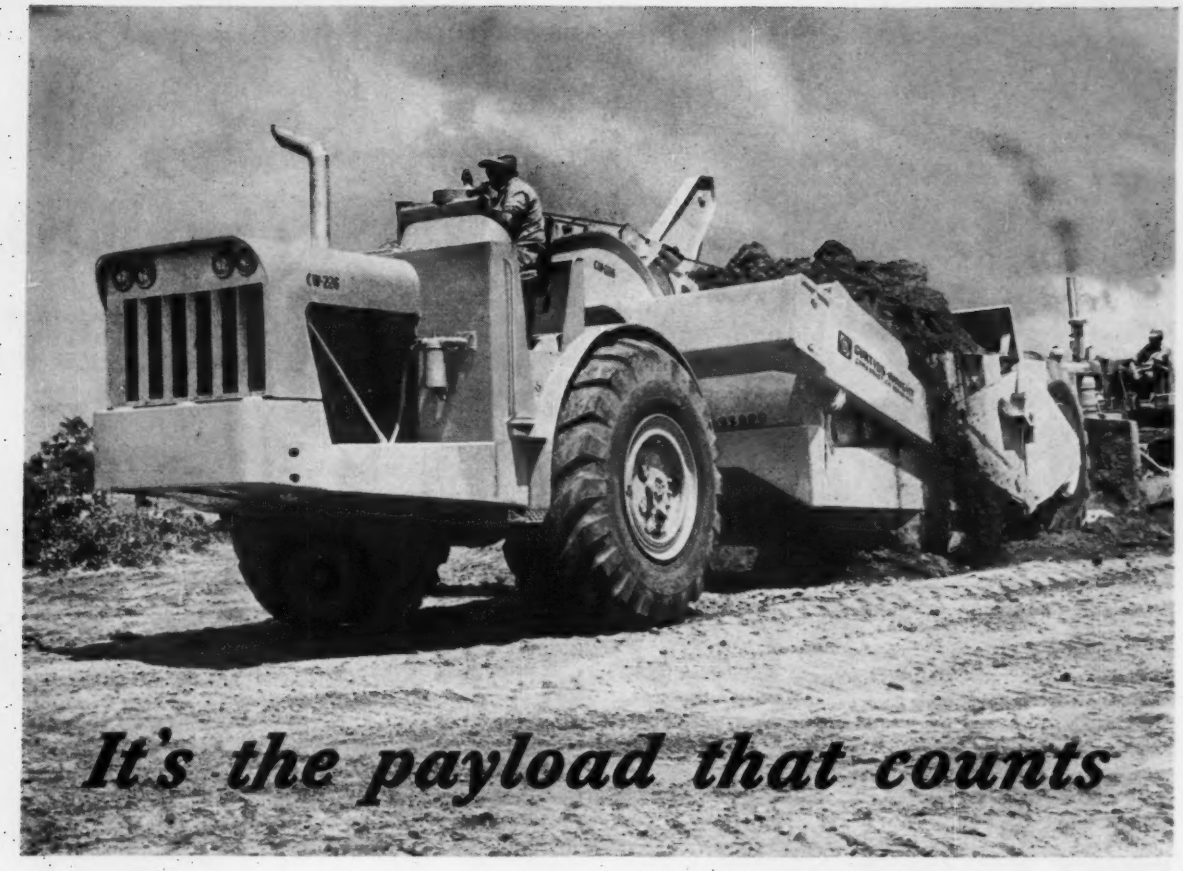


...New Curtiss-Wright Scraper Delivers 20% More than Rated Capacity!

... The chart at right tells the story ... Under difficult on-the-job conditions this Curtiss-Wright CW-226 *averaged* more than 5 yds. better than rated capacity ... moved this load at money-making speed — dumped swiftly and evenly ... This type of job-proven performance keeps cost-per-yard figures *down* — profit figures up! ... Every piece of Curtiss-Wright construction machinery is built to *earn* its price many times over — see your distributor today for complete information on the CW-226 and the many other units in the Curtiss-Wright line!

THIS ON-THE-JOB PERFORMANCE REPORT TELLS THE STORY

MODEL CW-226

2-axle, self-propelled scraper designed for rated capacities of:

26.0 Cu. Yds. Struck
36.0 Cu. Yds. Heaped

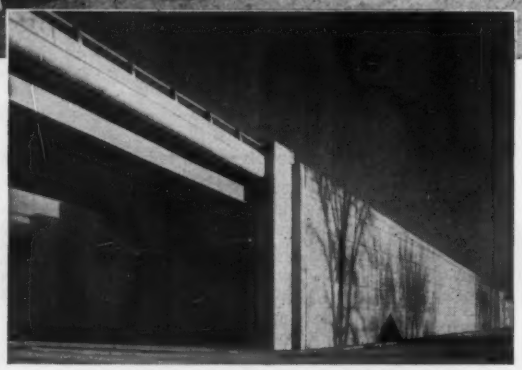
Average Payload Hauled:	31.2 Cu. Yds.
Loaded Unit Speeds to:	38. m.p.h.
Average Loading Time: (with single pusher, less than top h.p. rating)	1 min., 30 sec.
(with tandem pusher)	50 sec.
Average Loads:	85,800 lbs.

SOUTH BEND DIVISION

CURTISS-WRIGHT

CORPORATION
SOUTH BEND, INDIANA

FIR PLYWOOD ON CALUMET



Big prefabricated fir plywood form sections helped cut costs, speed work on 8-mile long Calumet Skyway.

CALUMET SKYWAY TOLL BRIDGE LOCATION:
West end of Indiana Toll Road to downtown Chicago

COORDINATING ENGINEERS:
De Leuw Cather & Company

CONTRACTORS FOR FORMWORK:
R. R. Anderson Co., Chicago
Arcole Midwest Corp., Skokie, Ill.
M. J. Boyle & Co., Chicago
J. M. Corbett Co., Chicago
Kenny Construction Co., Skokie, Ill.

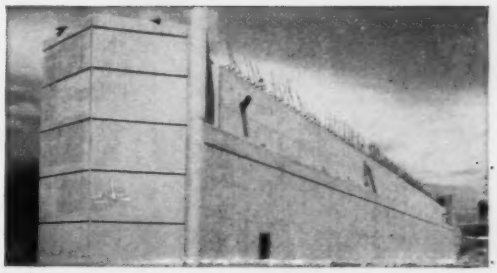
FORMS SPEED CONCRETING SKYWAY TOLL BRIDGE

GIANT FIR PLYWOOD FORM SECTIONS, as large as 28′ x 31′, played an important role in keeping work moving at a near record clip on the new eight-mile long Calumet Skyway which links the Chicago business district with the Indiana toll road.

The job features one of the world's longest retaining walls along three of the eight miles. Over 30 feet tall in places, the wall was formed by leap-frogging the big prefabricated plywood form sections. In most instances, forms were built to maximum wall height and simply cut down for shorter walls. Plywood forms were also used for abutments at street crossings and for beams and bridge decks on overpasses.

Plywood was called for in the job specifications for uniformly smooth concrete, but contractors on the job credit plywood's ease of fabrication and handling—coupled with a high number of re-uses (up to 15 or 20 pours)—with holding down costs as well.

All told, over 300,000 square feet of plywood forms were used by the five contractors concerned with pouring walls, abutments and decks.



Rustication lines on walls and abutments were achieved by nailing strips to face of plywood forms.

Fir plywood was also used for forming reinforced concrete beams and deck slabs on entrance ramps.

DOUGLAS FIR PLYWOOD ASSOCIATION
TACOMA 2, WASHINGTON
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Letters DFPA indicate material has been inspected and tested under rigid DFPA-Industry quality control program. Grades manufactured expressly for concrete form work include:

INTERIOR PLYFORM®—standard concrete form grade plywood made with moisture-resistant glue. Gives multiple (10-12) re-uses.

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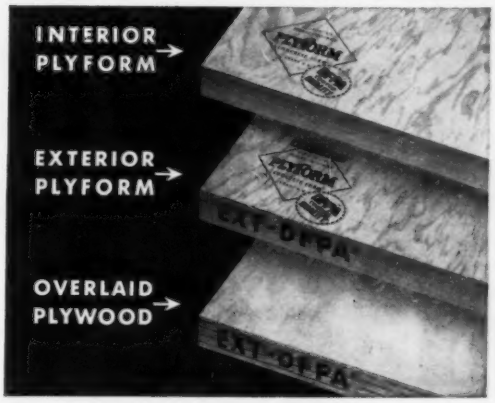
OVERLAID PLYWOOD—special panel with hard, glossy, plastic-like fused resin fiber surfaces. Forms smoothest concrete; up to 200 re-uses.



HOW TO ANCHOR STEEL FORMS FAST

You can anchor steel forms in a jiffy when you use Bethlehem Form Stakes. The sharp, projectile-point stakes drive easily, even in the hardest road base. And they are made of high-carbon, high-strength steel to withstand repeated battering. Yet they're economical, because they can be pulled out and used over and over again.

Bethlehem Form Stakes, of 1-in. diameter and 24 in. long, come in bundles of ten, wire strapped for convenience in handling. They can also be supplied in other sizes to meet special needs. For full information, call the nearest Bethlehem sales office.

Made of high-carbon, high-strength steel, these stakes are built to take heavy battering.

Bethlehem Form Stakes speed anchoring jobs because they drive fast. They are economical because they can be pulled out and re-used many times.

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BETHLEHEM STEEL

BETHLEHEM STEEL

Put this truck to work . . . without buying it!

For many companies, even the savings resulting from the use of the *right* equipment is overshadowed by the capital investment necessary. The logical answer, in such a case, is to lease.

Without tying up a cent of working capital, the Clark Lease Plan permits you to select materials handling equipment from the world's *most* complete line. No down-payment or outside financing is necessary, and you have the added advantage of dealing directly with your local Clark dealer.

The savings the equipment brings are usually greater than the leasing rate. In fact, most users of the Lease Plan find the cost-cutting factors of using modern handling equipment *far outweigh* the modest monthly rates. For a detailed brochure giving full particulars of the Clark Lease Plan, simply write: Leasing, Clark Equipment Co., Battle Creek, Michigan.

CLARK® EQUIPMENT

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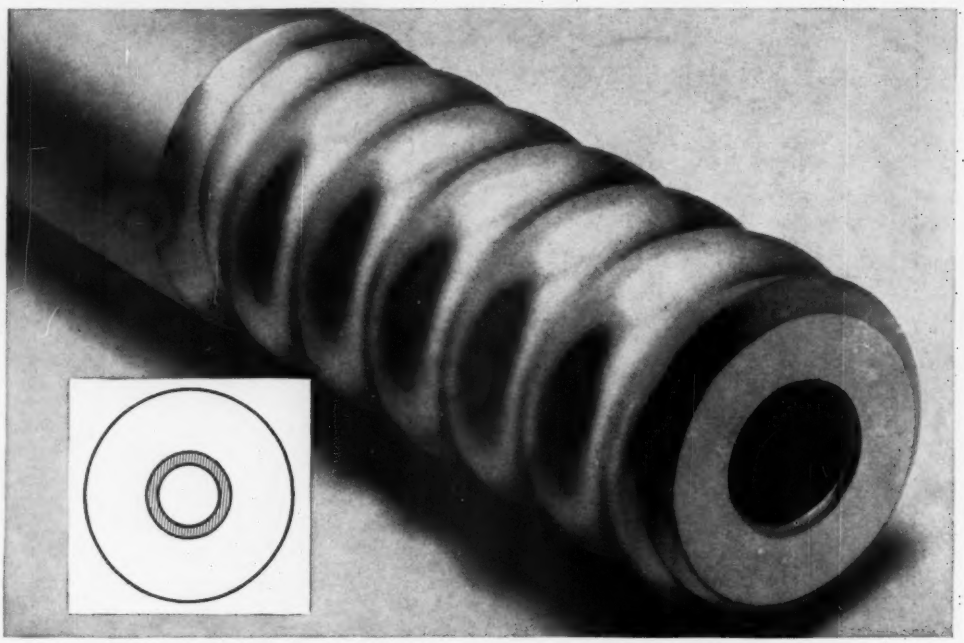
NEW ROPE THREAD MAKES UNCOUPLING EASY WITH SANDVIK COROMANT EXTENSION STEELS



Rope-Type Threads Afford No Starting Points for Fractures

Connections used in extension drill-steel must be easy to assemble and uncouple, and connections must not become weak links during the actual drilling. Sandvik Coromant's new patented rope thread makes it easy to join and uncouple the equipment . . . yet gives a solid and positive connection. The gently rounded form of this thread means trouble-free performance—eliminates common thread and coupling failures found in "saw-tooth" threads.

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Atlas Copco has special literature on Sandvik Coromant extension steel and long-hole drilling, available to you with no obligation. We suggest you write today!

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Construction Men in the News . . .

AGC Nominates New Officers for 1959

JAMES W. CAWDREY (left), Seattle builder, will be president, and JOHN A. VOLPE (right), vice president of the Associated General Contractors of America for 1959.

The two men were nominated at the midyear meetings of the AGC governing and advisory boards in Atlanta, Ga. Nomination is tantamount to election.

Cawdrey, who is president of Cawdrey & Vemo, Seattle, Wash., has been active in local and national AGC affairs for many years. He was president of the Seattle chapter in 1949 and had served on many local committees. With the national group he has been chairman of the building contractors' division, he was a national director for three terms, and he has served on the executive, finance, labor, membership, contractors forms and specifications, and ethics and trade practices committees. He has been in the construction business since 1934.

Volpe, the vice presidential nominee, was the first man to hold the post of Federal Highway Administrator. He was picked by President Eisenhower to fill the post on an interim basis when it first was created by Congress. Also, as commissioner of the Massachusetts Department of Public Works, he supervised and played an integral part in the development of that state's modern highway program. He heads his own firm, the John A. Volpe Construction Co., in Malden, Mass.

He has been active for many years in both chapter and national activities of the AGC. He is a member of the executive committee and of the advisory board.

Corps of Engineers

LT. COL. FRANK A. GERIG is the new deputy district engineer for the Corps of Engineers' Philadelphia District.

The post was specially created for Col. Gerig, formerly executive officer, to enable him to assume additional responsibilities in the $200-million work program the Engineers have under way in the Delaware Valley. He reports to Col. William F. Powers, district engineer.

Dravo

ROBERT HUGHES is the new director of research and development of Dravo Corp. He replaces W. L. Newhall who retires after 33 years' service with the company. Hughes first joined Dravo in 1945 and recently has served as engineering manager of the company's engineering works division.

Maxon

WILBUR L. JENKS is the new vice president in charge of building construction for Maxon Construction Co. Appointed to vice presidencies with him are JOSEPH C. SMITH, for nuclear and heavy industrial construction, and THOMAS J. SCOTT, for marine and heavy construction. All three will have their headquarters at the company's Dayton, O, general office.

Jenks joined Maxon in 1940 as chief building construction estimator on the East Coast Naval Ammunition Depot. In 1946 he transferred to Maxon's general offices in Dayton as supervisor of building construction where he had direct responsibility for the construction of power plants and commercial and industrial buildings of many types.

Smith joined Maxon in 1937. He served as a Naval officer during World War II, then became Maxon's chief engineer for a number of naval construction projects in the Pacific area. He went to the Dayton office in 1957 after serving as assistant project manager on a 6-yr atomic energy construction program at Oakridge, Tenn.

Scott joined Maxon in 1940. He served during World War II as a Lt. Col. in the Corps of Engineers then rejoined Maxon as an assistant project manager.

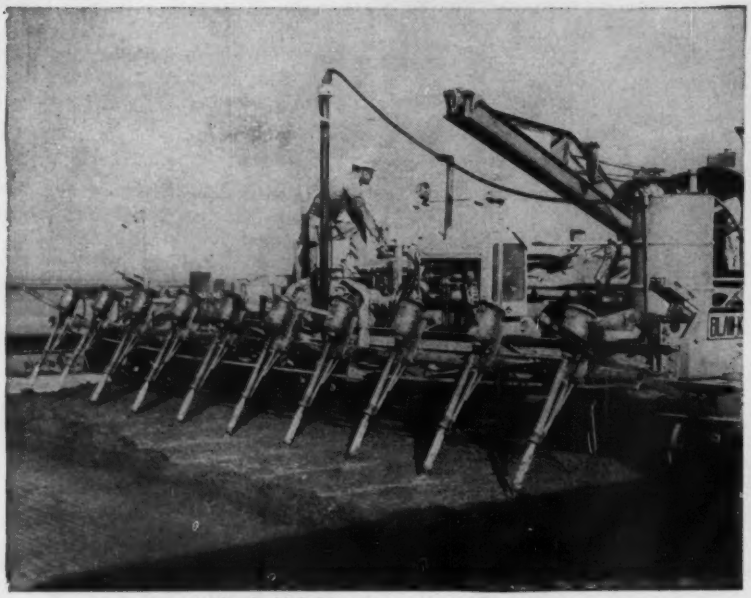
Edward Gray

CLARENCE W. UNGER is the new project manager for the Edward Gray Corp, general contractors and engineers, Chicago, Ill. Unger will work out of the company's Pittsburgh office.

National Constructors

RICHARD E. CHISLETT is the new secretary-treasurer of the National Constructors Association. He succeeds C. B. Bronson. Chislett formerly was chief of the Employer Relations Section, International Labor Office, Geneva, Switz.

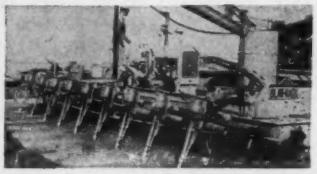
GANG VIBRATOR Assembly delivers faster, large area vibration



Hydraulic lift holds vibrators in raised position

Today, more and more specifications demand full depth, internal vibrations for thick concrete slabs. In airport runways, especially, with the increased use of jet planes, slabs must be thick and extremely strong. Naturally, to get ultimate strength, slow slump concrete must be poured and internally vibrated.

To keep pace with these new requirements, Stow has developed a Gang Paving Vibrator Assembly that is designed to internally vibrate even the stiffest concrete as fast as the spreader moves. The Stow Assembly is adjustable for depth and spacing of the vibrators, provides complete vibration regardless of the specifications for the particular slab. Vibrators are attached by brackets to a tubular mounting frame controlled by hydraulic cylinders which, by rotating the toolbar, raise and lower the vibrating heads. Power for the vibrators is furnished by a generator. The complete Assembly can be attached to a concrete spreader, or mounted on a special trailer towed behind the spreader.



Partially immersed

Totally immersed

For vibrating only next to the side forms, which some specifications require, two Stow hand-lever-controlled Assemblies are mounted at the ends of the concrete spreader to thoroughly vibrate the concrete next to the forms.

For more details, write for Stow's pamphlet, "Gang Vibration" which gives complete information including the number and size of vibrators for different width slabs.

Stow also makes a complete line of concrete vibrators, rotary trowels, concrete grinders and vibrating screeds.

STOW MANUFACTURING CO.
31 Shear St., Binghamton, New York
Please send me your pamphlet "Gang Vibration".

Name_____

Company_____

Street_____

City_____

State_____

Stow Manufacturing Co., 31 Shear St., Binghamton, N. Y.

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributor Appointments

Blaw-Knox Co.: N. A. Burkitt, Inc. of South Portland, Me., has been appointed distributor for the state of Maine by the construction equipment division of Blaw-Knox. Burkitt will handle batching plants, concrete spreaders and finishers, and paving forms as well as other road machinery in the Blaw-Knox line.

Spanall of the Americas, Inc.: Two new distributors have been appointed. Spanall of the Southeast, Inc., will be exclusive distributors of Spanall shoring in North and South Carolina, Virginia, Maryland, and the District of Columbia. Their headquarters will be in Durham, N. C. R. L. Castendyk Co. of Honolulu will be exclusive agent in the Territory of Hawaii.

Diamond T Motor Truck Co.: The following eight distributors have been appointed: Mercantile Properties, Inc., of Oakland, Calif.; Diamond T Walker Truck Co. of Pecos, Tex.; Federal Truck Co. of N. J. of Newark, N. J.; Krut's Garage of Brighton, Pa.; The Gasser Motors, Inc. of Napa, Calif.; Diamond T Odessa Truck Co. of Odessa, Tex.; Hanover Truck Center, Inc. of Allentown, Pa.; Gassis & Janey Truck Service of Cedar Rapids, Iowa.

Napco Industries, Inc.: The following distributors have been appointed to handle the newly introduced line of Crab four-wheel drive, four-wheel steer tractors: Western Machinery Co. of Phoenix, Ariz.; Smith Booth Usher Co. of Los Angeles, Calif.; Western Machinery Co. of Denver, Colo.; Casey & Emmert, Inc. of Chicago, Ill.; Embry Brothers, Inc. of Louisville, Ky.; Files & O'Keefe Co. of Portland, Me.; Construction Equipment Co. of Detroit, Mich.

Contractor: Dondlinger Const. Co.
Consulting Engineers: Black and Veatch Co.

STANG WELLPOINTS DEWATER 15½ ACRES FROM ONE CENTRAL PUMPING STATION

Good imagination, the best equipment, and sound engineering paid off in time saved and a job well done, in dewatering the site of the City of Wichita, Kansas' new secondary sewage treatment plant. A scant 300' from the high stage Arkansas River, water of the total area was controlled by a single stage wellpoint system and one central pumping station consisting of three 12 x 10 Stang wellpoint pumps—**in spite of a 20.5' average riverhead and a 7½" rainstorm.**

The advantages of this approach were many. In addition to the obvious saving of time, the system required fewer operators, much less maintenance, and afforded a flexibility that gave the contractor complete control, allowing him to control the water table in separate areas of the job all from one point.

For an efficient, time and money-saving answer to your next water handling problem, see Stang first. They're first in engineering, first in equipment, and first in service. Contact them now.

Putting water in its place

STANG ...anyplace!

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GReenwood 1-1439

SO. MINNEAPOLIS 17, MINN.
5947 Oakland Avenue
TAylor 7-1896

TACOMA, WASHINGTON
2339 Lincoln Avenue
Telephone: FUlton 3-3438

TULSA, OKLAHOMA
4026 South Urbana Street
Telephone: RIverside 2-6929

Lima Austin-Western 111 Crushing and Screening Plant, owned by Ronald Weaver, Dansville, Mich. High-grade specification material is being produced at an average rate of 1000 cu. yd. per 9 hr. shift.

"Lima Austin-Western will outlast and outproduce"

Says Ronald Weaver

Ronald Weaver, Dansville, Mich., has owned and operated a Lima Austin-Western 111 Crushing and Screening Plant since January, 1953. With his 4-man crew, he works all year 'round, producing specification material meeting county and State requirements.

Mr. Weaver says: "I have owned and operated other plants, and I am convinced that over a period of time a Lima Austin-Western will outlast and outproduce other comparable machines. I depend on this plant to show a reasonable profit, and it has produced all that can be expected.

"It is truly a portable machine. Not long ago I moved the 111, power plant, feeder, two dump trucks, dragline, bulldozer and other miscellaneous equipment 20 miles. The time involved in dismantling the equipment, loading, setting up, and resuming operation was only 3 hours.

"The quality of the equipment is shown by the fact that it has never required a major overhaul since it went into operation 5 years ago. But the most obvious reason for buying and using Lima-Austin-Western is the fine relationship and cooperation between not only the dealer and the operator, but more important, the manufacturer, the dealer and the operator."

Get the high-tonnage, low-cost Lima Austin-Western story from your nearby distributor . . . or write direct.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

5829

SALES AND SERVICE...
continued

F. W. Domres Equipment Co. of Manistee, Mich.; Machinery & Supplies Co. of Kansas City, Mo.; Ace Equipment Co. of Maywood, N. J.; Dravo-Doyle Co. of Pittsburgh, Pa.; Western Machinery Co. of Salt Lake City, Utah; Porter Supply Co. Inc. of Huntington, West Va.; Best Equipment Co. of Milwaukee, Wis.; Cartierville Machinery Co. of Montreal, Que., Can.; International Agencies & Machinery Co. of Vancouver, B. C. Canada.

On the Sales Front

Universal Manufacturing Corp.: Bernard E. Magette has been named general sales manager of the company. He will be responsible for Universal's distribution program, including supervision of sales of scaffolding, materials hoists, and tubular materials elevators.

Galion Iron Works & Mfg. Co.: William R. Troyer has been appointed sales manager of Galion's special products division. Porter Little becomes supervisor of sales and service on Galion graders and rollers. William A. Beale now is district representative for the state of Texas, Arkansas, and Louisiana.

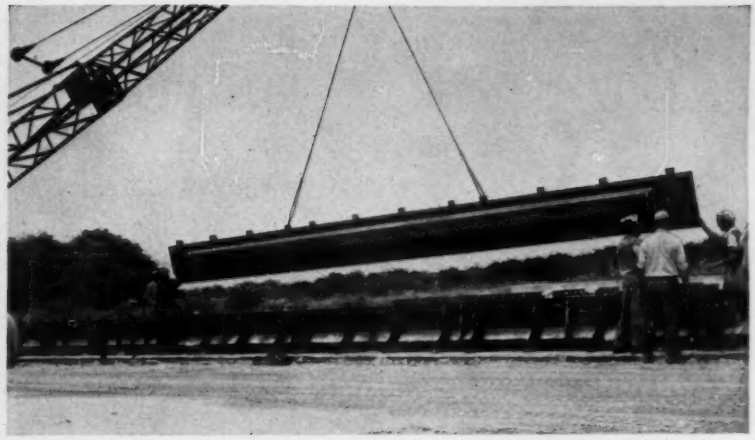
Pacific Car and Foundry Co.: Robert J. Sinclair has been transferred from the Chicago branch to the new Washington, D. C., office where he will concentrate on sales to the military forces. James P. Carr has been appointed Sales Manager of Carco Tractor equipment with headquarters in Renton, Washington.

In the Main Office

The White Motor Co.: Henry J. Nave, executive vice president of the company has been elected a director. His appointment fills the vacancy on the board caused by the recent death of F. H. Chapin.

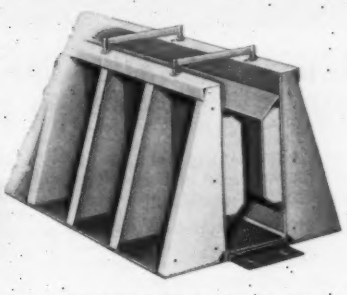
Cummins Engine Co., Inc.: Reece Hatchitt has been appointed director of international operations for the company. He will direct all functions of Cummins Diesel Export Corp, a wholly owned subsidiary.

Bucyrus-Erie Co.: Robert G. Allen has been elected to the board of directors and the executive



Produce 30 different sizes FROM JUST 4 I BEAM FORM-CRETE STEEL FORMS

Your form dollar goes further when you invest it in Form-Crete all-steel I Beam forms. That's because each form has a built-in design flexibility that allows the producer to adjust both height and width. Utilizing interchangeable pilot liners and displacement inserts, each basic I Beam form can produce between six and eight different I Beam sizes. In addition, all forms are of heavy gauge steel, fabricated under the strictest quality control to provide years of service delivering a clean, accurate product. Don't delay. Investigate and invest in one of the most versatile forms ever designed for prestressed concrete, Form-Crete all-steel I Beam forms. Send today for literature.



Fabricated in 10-foot lengths, these forms can be bolted together for removal of 40 feet or more of side form at one time.

Putting Ideas to Work

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SPRAGUE & HENWOOD MAKES THE EQUIPMENT FOR THE SOIL SAMPLE OR ROCK CORE YOU WANT

With the earth-shaking increase in construction, you need efficient, versatile sampling and coring equipment.

Sprague & Henwood, Inc., a leading manufacturer of all types of equipment for foundation investigation, has just the right type for you!

Illustrated above, on location, is a truck-mounted Sprague & Henwood Model 30 Core Drill Machine. On this foundation project this machine is recovering both good samples and good cores. The soil samples have already been recovered from this boring and now the machine is being used to core rock. Because of the versatility and economy of this machine it is becoming a favorite of many contractors and other users throughout America.

The proper machine alone will not give you the good soil samples and rock cores you want. You need just the right samplers, accessory equipment and coring bits. If you need a sampler to determine only the general classification of the sub-surface soils or a sampler to secure samples for testing in a soils laboratory, Sprague & Henwood has it. There is a complete line of accessory equipment and the best in "Oriented" Diamond Bits awaiting you. One call . . . to SPRAGUE & HENWOOD, Inc., and your drilling equipment needs can be met.

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SALES AND SERVICE...
continued

committee of the company. He is executive vice president in charge of manufacturing and sales. He joined the company in 1957 as a vice president.

Associations

Concrete Industry Board: The managing director of the Board, Admiral J. J. Manning, announces the election of new officers and an 11-man board of directors for the coming year. George N. Cohen, president of Euclid Contracting Corp., will be president of the Board. Nelson L. Doe becomes vice president, William J. McIntosh becomes secretary, and Dugald J. Cameron becomes treasurer. The aim of the six-year old association is the improvement of concrete construction for buildings and public works.

Asphalt Institute: The Institute will represent the United States at this country's first participation in the International Asphalt Congress which is holding its third meeting in Paris this year. R. O. Wilson, immediate past chairman of the board of the Institute will bring greetings of the asphalt industry of the United States. John M. Griffith will present a paper titled "The Treatment of Railroad Roadbeds with Asphalt." Previous meetings of this international event were in Brussels in 1948 and in Rome in 1954.

Special Mention

Spanall of the Americas, Inc.: The company's application to set up a tax exempt operation in Puerto Rico has been approved by Governor Monoz Marin of Puerto Rico. The corporation will set up a $100,000 plant to serve Latin America, the United States and Canada. Up to now all Spanall horizontal shoring has been manufactured in West Germany.

Clark Equipment Co.: Clark Equipment International, C. A., has established general offices at Havana, Cuba. The wholly-owned subsidiary of Clark Equipment Co. handles all overseas business and has numerous licensing and manufacturing arrangements for the company's products in England, France, Belgium, Germany, Australia, Brazil, and other countries.

26 Mack six-wheeler trucks with 5½-yard mixer bodies, plus four Mack tractor-trailer units to haul aggregate, handle the big part of the hauling requirements of Acme Ready Mix Concrete Co., of Rockford, Illinois. Mack quality construction pays dividends in operating economy and low maintenance costs, enabling Acme to handle both large and small jobs profitably.

From front bumper to rear axle...

QUALITY-BUILT for PROFITABLE HAULING

Ask the men who really know—the men who operate Macks—about the advantages they get from Mack quality construction. They'll tell you about the unexcelled economy . . . minimum down time . . . the extra years of dependable service —that add up to truly profitable operation.

Mack quality begins with Mack-built major components—front and rear axles, engines, frames, transmissions and brakes—which are made to the highest standards in the industry . . . with Mack features like the exclusive Balanced Bogie with Power Divider for positive traction under severe weather and terrain conditions . . . and extends to Mack cabs, which offer the utmost in driver visibility and comfort, easy access to all working parts, and minimum upkeep requirements.

You'll find that Mack quality construction shows up in every phase of operation—and, where it really counts, in net profit figures.

Check with your Mack branch or distributor today to find out how Macks' profit-making capabilities can best be put to work for you. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK
first name for
TRUCKS

Construction Equipment News...

Travels on Rubber

Barber-Greene's new model 873 paver works on crawlers but travels on hydraulically retractable rubber tires. A towing tongue permits the paver to be towed by a light truck at 30 mph. Other features include hydraulically raised hopper sides that permit the operator to empty the hopper without hand shoveling; and a joystick-type directional control lever. The paver offers laying widths from 6 to 12 ft in 3-in. increments. Tamping, leveling, and thickness controls are the same as used on the larger 879-B finisher.—**Barber-Greene Co., Aurora, Ill.**

IH Shows New Tractor

The 105-hp TD-15 is the latest addition to the International Harvester crawler tractor line. The new tractor features International's six-speed, single-stick transmission, and shuttle bar control that permits instant reverse or forward travel without shifting. Other features include a six-roller track frame that offers improved stability and new 1,000-hr bushing-type track rollers that cut maintenance requirements. A full line of attachments, including a redesigned Drott 4-in-1 Skid-Shovel, is available.—**International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.**

Loads Blasting Agent

The Atlas Jetloder, designed to mechanize the loading of ammonium nitrate explosives, uses compressed air to blow the blasting agent and sand stemming into blast holes. In tests, the machine placed four 80-lb bags in 2 min. Hand loading would take a three-man crew about 30 min. After blast holes are primed, 80-lb bags of ammonium nitrate are dropped into the machine along with a gal of diesel oil for each bag. The machine does the mixing, then delivers material to the blast hole through a plastic pipe. —**Atlas Powder Co., Wilmington 99, Del.**

Biggest Gradall Yet

The 1¼-yd Gradall, largest fully hydraulic excavator available, lifts up to 14,000 lb and with boom extensions can dig 23-ft deep trenches or reach 47 ft. The machine features 360-deg, two-speed swing. Two 100-hp engines provide hydraulic power through two tandem pumps that provide six pump sections. This permits the operator to work all arm action movements at the same time at full power. The machine is available on a 8x4-Duplex truck carrier or on crawlers powered by hydraulic motors.—**Warner and Swasey Co., 5701 Carnegie Ave., Cleveland, Ohio.**

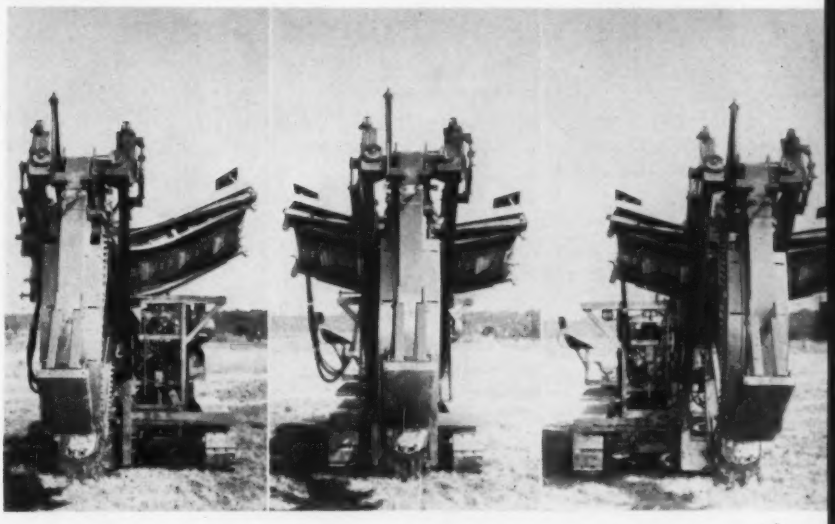
Sling Lifts Big Load

Extra safety and less load damage during the handling of heavy girders are guaranteed when Gripper metal mesh slings pick up the load. The sling in the photo is 16 in. wide, 256 in. long. It is lifting a 100-ft long, 28,000-lb girder. The spiral loop construction of the metal mesh sling cannot snap suddenly and drop the load. The sling places the weight of the load on the bottom flange of the girder instead of on the lighter top flange. The Gripper sling does not even cut through the protective paint coating.—**Cambridge Wire Cloth Co., Cambridge, Md.**

Wheel Moves 60 in.

The model JS-30 trencher (right), one of four new machines introduced by the Cleveland Trencher Co. last month, features a power-shifted, power-tilted digging wheel that can be moved laterally 30-in. to either side of the machine's center line. This design enables it to dig a trench flush with the outer edges of the crawler tracks or at any point in between. It can excavate short runs of trench up to 6 ft wide without repositioning the crawlers. The JS-30, which has four digging speeds, is powered by an International Harvester 56-hp diesel.

continued on page 154



Rubber-Tired Gizmo

The self-loading Gizmo Transloader is a rubber-tired materials-handling machine with a large dipper with teeth, a fold-back mechanism that loads a self-contained haulage body, and a dump door. One man handles six-ton payloads with the vehicle. The machine is a successor to the crawler-mounted Gizmo mine and tunnel mucking machine. Power brakes and steering and torque converter drive are standard, as is an oscillating coupling between the tractor and haulage body.—**Sanford-Day Iron Works, Inc., Dale Ave., Knoxville, Tenn.**

Lima Adds Excavators

Lima's type 64 excavator has a 1¼-yd dipper, 22-ft boom, and 17-ft dipper handle. Equipped with fast-acting air controls, it is available on either a crawler or truck base. Standard crawlers are 13¼ ft long and 10 2/3 ft wide, with 30-in. threads. The machine has a 40-ton crane rating. Also new in the Lima line is the 64-SC, designed for special crane service. Rated at 50 tons, this machine has a pin-connected, welded alloy-steel boom built in two tubular sections. Maximum boom length is 150 ft.—**Baldwin-Lima-Hamilton Corp., Lima, Ohio.**

Handles the Big Jobs

The Parsons 420 Trenchliner, designed to handle big pipe-line jobs, has a big digging wheel that takes 36, 42, or 48-in.-wide buckets. Optional sidecutters increase trench widths to 52 in. Maximum depth of cut is 7½ ft. Buckets, equipped with replaceable teeth, are available with either tine or solid backs. The trencher's hydraulically driven, 36-in.-wide conveyor belt can be worked at speeds up to 621 fpm. Weighing about 42,000 lb, the 420 can travel at 2.5 mph. Power is supplied by a 120-hp diesel.—**Parsons Co., Newton, Iowa.**

PUBLIC
AUCTION
CONTENTS OF THESE PREMISES TO BE AUCTIONED MAY 12, 2:30 P.M.
OFFICE FURNITURE, TYPEWRITERS, BOOKS, ADDING MACHINES, FILING CABINETS, RUGS, LAMPS, TABLES, COUCHES, CLOCKS, ETC.

An embezzler on our payroll brought us to this!

(From an actual case)

Discrepancies in our firm's books might never have been discovered if it hadn't been for an alert bookkeeper. When we questioned our treasurer his explanation seemed plausible enough—but that night he skipped town!

We soon discovered that this trusted employee had really been a very clever thief. He had juggled the books skillfully enough to drive a big car, live in a fine home, entertain lavishly . . . with our money!

An audit showed that he had embezzled more than $100,000 over a seven-year period. The loss was more than we could take—we were out of business.

* * *

This firm might still be flourishing if management had had the foresight to invest in a Hartford Blanket Fidelity Bond. It offers solid protection against employee dishonesty.

If losses occur, a Hartford Blanket Fidelity Bond makes good for money, merchandise, equipment, or other company property stolen by anyone working for you.

Your Hartford Accident and Indemnity Agent or your insurance broker will be glad to tell you more about the many advantages of Hartford Blanket Fidelity Bonds. Call him . . . *now.*

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Northwestern Fire and Marine Insurance Company
Twin City Fire Insurance Company, *Minneapolis 2, Minnesota*

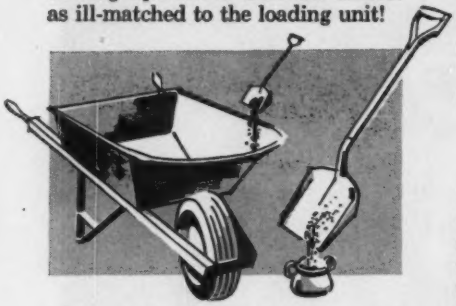
(Advertisement)

How to select size and number of hauling units for your job

It's not difficult to decide on the right size hauling equipment when you buy a complete fleet at the same time as your loading unit. However, this situation rarely occurs. Most of the time, because of existing equipment, there are 2 problems you face in determining the size of haulers to be purchased:

FIRST — New machines are usually bought to improve an existing hauling fleet — yet they must have travel speeds and capacities that will permit them to work efficiently with older haulers.

SECOND — New machines must fit ability of existing loading unit. You would not use a child's sand shovel to load a wheelbarrow . . . nor would you use a farmer's scoop shovel to fill a sugar bowl. These examples may seem absurd — but every day you can see hauling units on some earth-moving operations that are almost as ill-matched to the loading unit!



If your haul units are too small

Major production losses are caused by use of hauling equipment too small in capacity. Each haul unit should hold at least 4 dippers or buckets of material from your loading unit. If they are too small for this, your loading unit is slowed down while waiting for frequent spotting of haul units.

When haul units are too large

Inefficiency will likewise occur when your haulers are too large (where more than 8 to 10 dipper or bucket loads are needed from loading unit). Over-sized haulers usually make the loading unit reach too far or move up too often in securing and dumping its load. Either condition causes wasted time for your loading rig, and excessive waiting time for the hauling unit next in line.

Factors affecting number and size of haul units to be used

The production ability of each hauling unit . . . and the number required to keep maximum production moving from your loading unit . . . must be determined for each individual job. Factors to consider in regard to number and size of your haul units are:

1. Type of material being loaded.
2. Loading unit's maximum output potential.
3. Haul distance.
4. Conditions of haul — surface and grades.
5. Dump area conditions.
6. Mechanical efficiency of hauling units.
7. Maintenance and service facilities.

Figure 60-minute hour for hauling units

In determining the number of haul units required, instead of figuring on the basis of a 50-minute production hour by your loading unit, estimate on a 60-minute hour. Undoubtedly, cases will arise where 50 minutes per hour will be the maximum output from your loader. If hauling units are determined on that basis, however, there will normally be increased waiting time — since your hauling-unit delays will seldom occur at the same time as those of the loading unit. And remember, it is impossible to haul out more material than the loading unit's maximum production capacity.

Any loading unit requires a time factor for moving into better loading range for easier and faster digging. Also, a factor of time is always necessary for clean-up in front and on the sides of the loader, before it moves. However, usually this can be accomplished during wait periods for haul units. Except on the "perfect" job, there will always be some bunching of hauling units that will cause wait time for your loading unit.

Use of standby hauling equipment

Insuring adequate hauling capacity is one more way of keeping your production rate near the maximum. The use of standby hauling equipment for emergencies is generally recommended. When not in operation, large size standby units represent a cost of not more than $3.00 per hour for ownership cost. Say, for instance, your hauling fleet consists of 4 units, efficiently hauling 300 cu yd per hour. The loss of one would cut your production by 25% — or 75 cu yd for each hour of downtime. In such a case, the cost of a standby unit would be more than offset by the increase in yardage it could provide.

For example, 10% downtime on a 4-unit fleet for a 40-hour week is 16 hours. 16 hours production gained by a spare would be 1200 yards. Figure this gain against your $120 per week for standby cost! You get a plus of 1200 yards production at a cost of only 10¢ a yard . . . in addition to further savings in any plant, or other processing operations slowed down by partial capacity during a hauling shortage. One cent per cubic yard cost of insurance for maximum output should be considered a very reasonable investment.

How to figure load time

Loading units in the range of ⅜ to ¾-cu yd dipper size will normally complete a pass or cycle in 15 to 20

"D" Rear-Dump
11 ton cap., 138 hp, 29.5 mph

"C" Rear-Dump
22 ton cap., 210 hp, 28 mph

"B" Rear-Dump
35 ton cap., 300 or 335 hp, 28.7 mph

seconds. Loaders varying from ¾ to 2 cu yd will normally make a pass in 20 to 25 seconds; those from 2 to 3½ cu yd should produce a bucket or dipper full in 25 to 35 seconds. This pace can be maintained during the loading time. Therefore, the following formula will usually give your approximate loading time:

$$\frac{L \times C}{D \times 60} = LT$$

L = Hauling unit capacity in cu yd based on 3:1

C = Load time per dipper or bucket, in seconds

D = Dipper or bucket capacity in cu yd

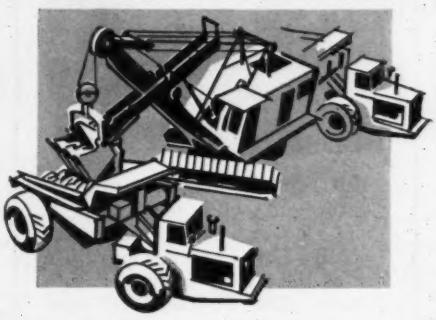
LT = Load time in minutes

Factors that affect production ability of the loading unit are:

1. Type of material.
2. Its condition when being loaded.
3. Height of face for shovels, or distance of reach for draglines.
4. Depth of cut from which material is being taken by loading unit.
5. Distance of swing from loading point to spot where load is dumped into hauling unit.

Proper position of haulers at loading unit

For maximum loading efficiency, there should be a hauling unit under loader at all times. If possible, lay



out your jobs, so that one hauler is being loaded on one side of the loading unit while another is being spotted on the opposite side. Watch to keep loading within a 90° swing.

It is not intended to imply in any way that your hauling fleet should be so large that numerous units are waiting for your loader to fill them. If hauling units are maintaining proper haul-road speeds, and loads are dumped promptly — yet extra units are standing by at the loading unit — then it is probable that unnecessary haulers are being operated. This, of course, assumes that procedure at your loading unit is effective.

To insure success at your job avoid delay in any phase

Overall phases of a hauling operation include:

1. Spotting time.
2. Actual load time.
3. Haul time.
4. Dump time.
5. Return time.

When all avoidable delay in each of these phases has been eliminated, the lowest cost per cubic yard for the material you handle will result.

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R-1800-G-2

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CONSTRUCTION

ANALYSIS OF GROUND-WATER PROBLEM AND PRE-BID DEWATERING ESTIMATE WITHOUT OBLIGATION

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WELLPOINT CORP.
SALES • RENTAL • CONTRACT
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W. Palm Bch., Fla. • Hammond, Ind.
In Canada: Construction Equipment Co., Ltd.
In Venezuela: Drew Bear & Sons C.A.

The digging wheel can be tilted up to 6½ deg to either side of vertical so that the machine digs an even trench when one crawler is forced to be higher than the other. A power-raised and lowered crumbing shoe pivots back and up above the digging wheel so that it can be set for digging without worrying about shoe clearance. The four new Cleveland trenchers—the J-20, J-30, J-40, as well as the JS-30—all feature a new V-shaped discharge conveyor that is driven, shifted, and reversed in direction of discharge by an independent hydraulic drive contained within the conveyor. They are controlled from the operator's seat. Other features of the line include antifriction, bearing-mounted tracks and 16x3-in. hydraulic steering brakes. Cleveland's redesigned model 240 trencher now has a V-type conveyor with hydraulic power-shifting and power-folding. For moving from job to job, its 12-ftx30-in. conveyor power-folds down to within the trencher's 8-ft overall width. The model 190 backfiller now has a water-cooled throw-out clutch that prevents overheating.—**Cleveland Trencher Co., 20,100 St. Clair Ave., Cleveland, Ohio.**

Snow Plow for Buggy

Contractors who now own a Prime-Mover M30 materials-handling buggy can get extra use out of the rig by turning it into a snow plow. Prime-Mover now has available a 60-in. blade attachment that rolls snow to either side of the machine. Lateral grooves in the moldboard prevent snow from packing. The cutting edge is removable and easily reversible to double its life. The M30 has a hydraulic torque converter drive that provides smooth acceleration and reduces stalling in deep drifts or under heavy loads.—**Prime-Mover Co., Muscatine, Iowa.**

continued on page 156

INDIAN
DRINKING WATER & SUPPLY TANK NO. 75G

Replaces unsanitary bucket and dipper. Portable. Push button faucet. Takes cold, clean water to workers right on the job. 5 gal. steel tank is curved to fit the back. Sturdy construction. Highly popular.

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12 gallon capacity
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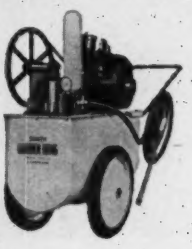

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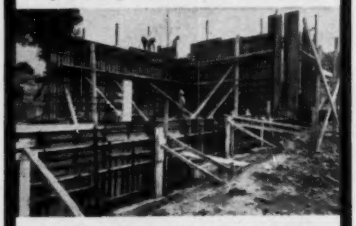
speed-up concrete forming



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For draglines, shovels, scrapers, bulldozers—you can't beat Tiger Brand Wire Rope for long, low-cost service.

Changing the face of the nation's highways

with the help of USS Tiger Brand Wire Rope

On most of the big highway jobs, Tiger Brand Wire Rope is doing the heavy work. It supplies the steel "muscles" for shovels, draglines, scrapers and other earth-moving equipment.

Contractors are large users of Tiger Brand Wire Rope because this rugged steel rope lasts longer, moves more materials, and gets the job done quicker at less cost. Its Excellay Preformed construction makes it easy to handle . . . quick to install. It has less tendency to loop, kink or whip . . . and it offers highest resistance to bending fatigue.

Tiger Brand gives long, trouble-free service because it's made from the best possible steel. From ore to finished product, every step of production is rigidly controlled to guarantee top quality. And the rope is engineered to fit the job —engineered by one of the finest staffs in the country, and backed by the basic research of the United States Steel Corporation. Next time you need wire rope, rig up with Tiger Brand. It will keep your machines on the job. American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

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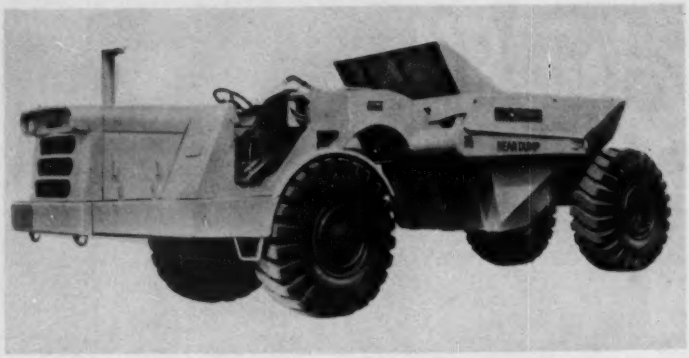
Clark Shows Its First Rear Dump Body

Clark's first rear dump unit, a 12-yd heaped capacity wagon that takes the Michigan 110 scraper tractor, features a low loading height (7½ ft) and a well-protected hydraulic system. The tractor has a four-speed, power-shifted transmission with



torque converter that delivers up to 31.4 mph. A planetary wheel drive axle, power steering, and tubeless tires are standard.— **Clark Equipment Co., Benton Harbor, Mich.**

A BRIDGE IN TIME . . .

• Bailey bridge units being assembled by unskilled labour.

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. . . prevents blockage of highways

and allows vital road communications to remain open to traffic throughout the year. The Bailey bridge is invaluable also as an access bridge in the opening up of new territory and as a permanent structure

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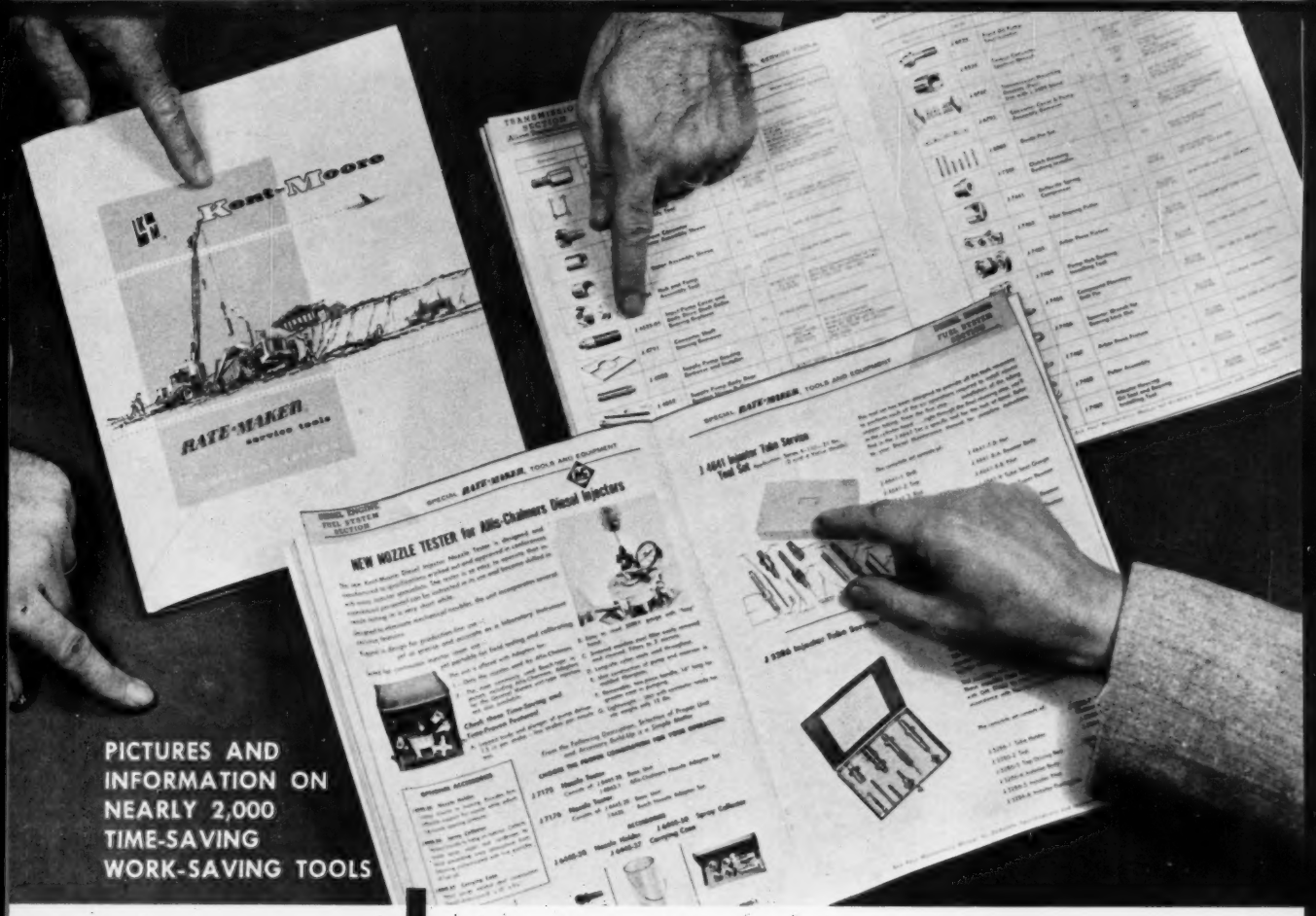
THOS. STOREY (ENGINEERS) LTD., STOCKPORT, ENGLAND

Removes Rust, Scale

The Von Arx pistol is designed to solve de-scaling, de-rusting, and cleaning problems ranging from paint stripping to leveling weld seams. When the operator pulls the trigger, compressed air drives a series of hardened steel needles against the point to be cleaned. A spring-loaded recoil action permits needles to surround bolts or other odd shapes so that the tool can do a thorough job. Two sets of needles are available; one set for breaking through hard scale where indentation of the parent material does not matter; another set for lighter work that polishes and does not disturb the surface of the original material. Normal working pressure of the gun is 88 psi and air consumption is about 12.5 fpm. Air continually flows over the working surface to remove scale, rust, or paint. The pistol raises very little dust, according to the manufacturer. Needle life is estimated to be 500 hr. The pistol is available with a variety of needle sizes and three chisels for chipping, breaking, and scraping jobs. The tool cleans dried concrete from equipment, roughs up metal for hard-facing, cleans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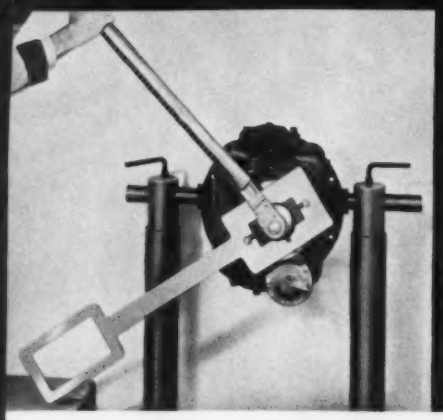
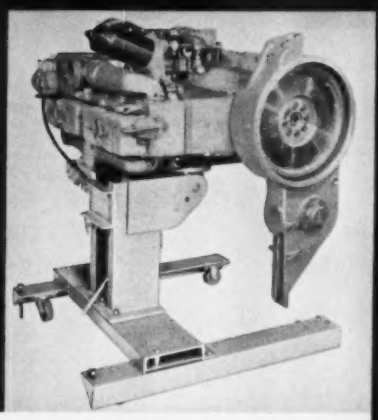
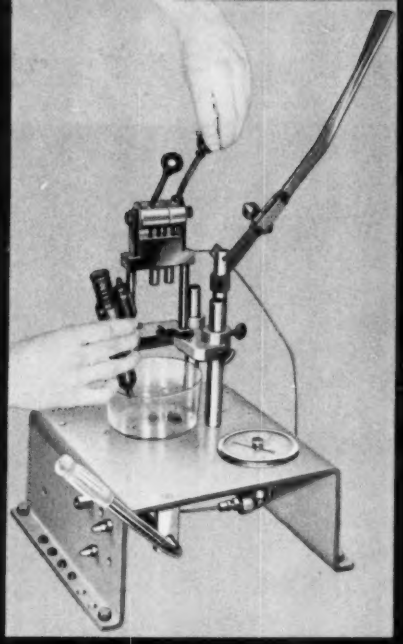
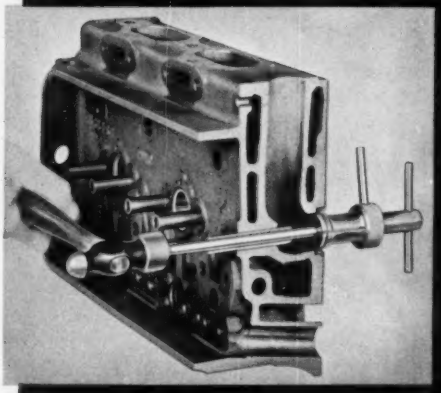






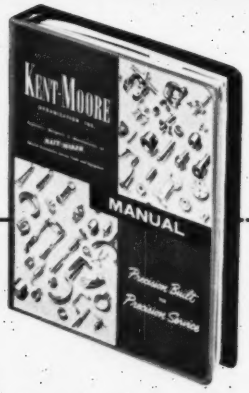
Make the Tough Jobs Easy!



You'll Get "FACTORY-APPROVED" Repair Jobs With K-M Work-Saving, Time-Saving Tools

Check your Shop Manuals—see how often Kent-Moore "J"—numbered tools are recommended for service operations that can't be done efficiently or properly with ordinary tools! "Rate-Maker" Service Tools are designed in close cooperation with the equipment manufacturer to duplicate factory-assembled conditions in the field. They save time, prevent parts damage and reduce vehicle downtime because they're the *right* tools for every job! Whatever your service needs—routine body or chassis maintenance, tune-ups or major overhauls—specify Kent-Moore "Rate-Maker" Service Tools for a better job, done in less time, to factory "specs".

58-F5



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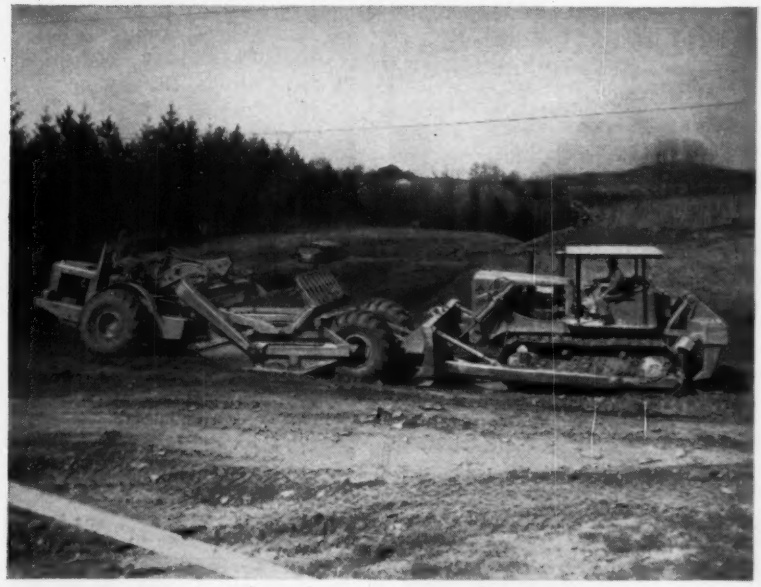
Big new Kent-Moore Catalog is packed with pictures and information on "Rate-Maker" Special Service Tools and Equipment on all major makes of trucks and heavy equipment.

He beat the schedule in spite of bad weather

with Allis-Chalmers Construction Machinery

In spite of the loss of 44 working days due to bad weather, the Bracken Construction Company finished the relocation of Route 861 near Bethlehem, Pennsylvania, well ahead of the 135 days allotted.

Dale Bracken
Bracken Construction Co.
Sligo, Pennsylvania



HD-21 quick-loads TS-260 motor scraper. With ripper, HD-21 weighs approximately 61,634 lb . . . delivers 225 net hp.

225,000-yd operation

This contract included the moving of 225,000 cu yd of dirt and shale. Bracken used a fleet of Allis-Chalmers machines on this operation—HD-21 and HD-16 tractor-dozers and TS-260 motor scrapers. The company also owns an HD-6G tractor shovel and a TR-260 rock wagon.

Job superintendent, Dale Bracken, says the powerful HD-21 tractor-dozer, equipped with a Tractomotive ripper, did an excellent job—loosening 24 in. of shale and rock at a pass. On tough jobs like this, the ability of the HD-21 torque converter tractor to automatically match power and speed to load lets it handle such large cuts.

Two of Bracken Company's HD-16 tractor-dozers shape a heavy fill up to 57 ft deep. A third HD-16 was used for push-loading in the borrows.

2,400-ft cycles

Speeding through a 2,400-ft cycle, each TS-260 with a struck capacity of 11 cu yd averaged 1,000 cu yd per shift. Bracken reports positive forced ejection and high apron lift saved time by dumping wet loads quickly and cleanly.

Preventive maintenance helps build high production

Mr. Bracken credits his company's ability to meet earth-moving schedules to the combination of modern construction machinery and a sound preventive maintenance program. Allis-Chalmers construction machinery will give *you* dependable performance like this, too. Your Allis-Chalmers dealer has machinery for every earth-moving job. He will demonstrate the machine of your choice on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Look ahead... *move ahead* ...and stay ahead with **ALLIS-CHALMERS**

Track Overhaul Time Cut 50%

OTC "Trackmaster" Track Press

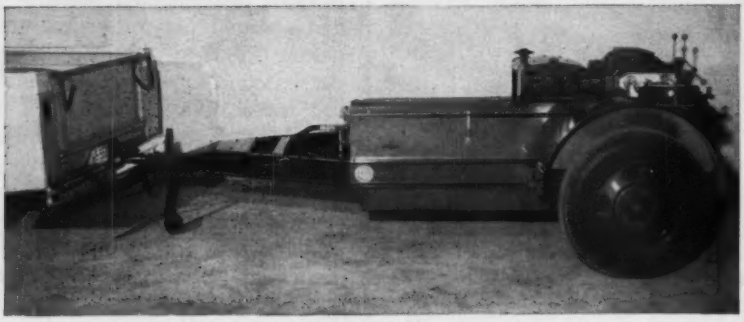
By pressing pin and bushing simultaneously, without broaching or shearing sidelinks, all size tracks can be overhauled faster, safer and easier with the new OTC "Trackmaster" hydraulic track press. With grousers off or on (2 bolts removed), the "Trackmaster" one-man operation does a better job, with complete safety to the operator. Basic specs—ram capacity 125 tons; hydraulic winch—5800 lb. pull; power—either gasoline engine (11.4 hp) or electric motor (7½ hp).

NEW OTC HYDRAULIC-POWERED TRACK-BOLT IMPACT WRENCH

OTC's amazing new impact wrench (1" square drive) eliminates the need for an air compressor or an electric power source by receiving trouble-free hydraulic power from the "Trackmaster" basic hydraulic system.

TRAILER-MOUNTED "TRACKMASTER"

Now—take the "Trackmaster" to the jobsite for faster track work and less downtime. THD Wisconsin gasoline engine (11.4 hp @ 2200 rpm) is standard, although any motor of sufficient horsepower can be used. Trailer width overall: 7'2".



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380 Cedar Street • Owatonna, Minnesota

castings, chisels out pipe channels, and roughs up concrete or stone. **—The Marindus Co., 52 Wall St., New York 5, N.Y.**

Fills Out Hose Line

To fill out its line of Surgepruf hose and reusable couplings, Alemite has introduced Buna-N low-pressure hose and Shur-Lock couplings. These additions expand the Surgepruf line to cover a full range of low, medium, and high-pressure hose and couplings. The new low-pressure hose can handle a variety of materials, including hydraulic fluids, hot lubricating oils, gasoline, diesel fuel, and other liquids over a temperature range of from –40 deg to 275 deg F. The reusable Shur-Lock couplings are available in thread and tube compression types. To install hose, just oil it and push it onto the coupling insert and it is ready for use. **— Alemite Div., Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.**

Insures Proper Timing

More accurate timing of delay electric blasting caps connected in parallel circuits is accomplished with the new Atlas Arcmaster blasting switch. The device is designed to eliminate erratic timing that often is associated with gasless-type long period (½-sec) delay electric blasting caps. Arcing caused by

His Allis-Chalmers "Dozers" spearhead levee job

Sweetman Construction Co. is building a levee near Sioux Falls, South Dakota—moving nearly one million yards of earth to end costly spring flooding of the Sioux river. Supt. William Bruhn and his spread of Allis-Chalmers HD-16 tractor-dozers spearhead the job. Bill and his operators think highly of the HD-16's. After months of heavy dozing, the tractors maintained a perfect "stay-on-the-job" record.

William Bruhn, Supt.
Sweetman Construction Co.
Sioux Falls, South Dakota

Allis-Chalmers tractor-dozer grades fill on levee. With hydraulic-controlled steering, the big, sure-footed HD-16 handles easily in heaviest material.

148-hp HD-16's handle big-tractor jobs with ease

The two-mile Sioux Falls levee job involves straightening and deepening the river bed—actually shifting the channel three quarters of a mile. Nearly one million yards of earth will be moved to excavate the channel and build the embankment.

Dependable Allis-Chalmers HD-16 tractor-dozers are spreading scraper-hauled fill, heaping muck for the dragline, leveling haul routes—setting a fast pace for other machines wherever they work.

Hydraulic steering a big help

Operators like the way they handle—the sure "feel" of the controls. Hydraulic-controlled steering takes the hard work out of maneuvering, even in the toughest dozing.

The HD-16's big, 148-hp Allis-Chalmers diesel engine delivers plenty of torque to lug through on heavy dozing—lively performance under all job conditions.

Easy servicing pays dividends

Like all Allis-Chalmers crawler tractors, the HD-16 requires lubrication *only once every 1,000 hours* for truck wheels, idlers and support rollers. This means a bonus of hundreds of production hours—a feature that pays dividends on anybody's job.

See what this great tractor can do for you! Six models to fit your needs. 148-hp, all-gear drive, 150-hp with hydraulic torque converter. Bare weight is approximately 33,000 lb. Ask your Allis-Chalmers dealer to demonstrate on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Look ahead... *move ahead* ...and stay ahead with **ALLIS-CHALMERS**

that speeds payloads...
with J-M Friction Materials

Riveting J-M woven lining to a hoist brake band.

You may never even try the egg-lift trick . . . but precision-engineered Johns-Manville Friction Materials *do* assure you of the positive control that speeds payloads on any type of job.

These job-proved friction materials are rugged and durable... designed to pay off in terms of more loads per hour in complete safety. And you can choose from a wide range of linings, blocks, facings, cones and segments that are standard equipment on leading makes of heavy-duty units. For the right material for your needs, see your Johns-Manville Distributor or write Johns-Manville, Box 14, New York 16, N.Y. In Canada: Port Credit, Ontario. Ask for Brochure FM 35-A.

JOHNS-MANVILLE
100 YEARS OF QUALITY PRODUCTS...1858...1958

the continued application of excessive electric current often causes bad timing. The switch is designed primarily for tunnel work, but it can be used in any situation involving parallel circuit delay blasting. Besides improving timing, it substantially reduces the possibility of misfires, according to the manufacturer. The Atlas Arcmaster has a load-type circuit breaker that limits the application of electric current to the blasting circuit to .025-.030 sec. It can be used with 440 and 220-v power sources. The switch is housed in a rugged steel case. — **Explosives Div., Atlas Powder Co., Wilmington 99, Del.**

Tough Protective Film

A major improvement in polyethylene film, which has grown in popularity in recent years as a protective coating for construction jobs in wet or cold weather, has been developed by Owens-Corning Fiberglas Corp. The new protective film—reinforced with Fiberglas—is much stronger. This allows thinner sheets of the material to be used. Reinforcing also eliminates stretching, bagging or billowing, and it increases the number of times the film can be reused. All the original qualities of polyethylene, which resists moisture and dust and seals in heat, are retained in the new film. **—Industrial Div., Owens-Corning Fiberglas Corp., 16 E. 56th St., New York 22, N.Y.**

Ottawa Attachments

The Ottawa model LX backhoe, which digs 12½ ft deep anywhere through a continuous 190-deg arc, and the Ottawa front-end loader are now available for the Oliver Industrial wheel tractor line. Adaptations have been made for the Oliver 550, 770, 880,

He increased production 20%

with an Allis-Chalmers tractor-dozer

Clyde Geraghty's Allis-Chalmers tractor-dozer really pays off in Alaska's semi-arctic conditions. The day-by-day dependability of his 66.5 net hp HD-6 makes 20 percent more operating time available.

Mr. Clyde Geraghty, President, Mitchell Truck & Tractor Service, Inc., Fairbanks, Alaska.

Dozes earth in summer

During Alaska's comparatively few weeks of summer, Geraghty's HD-6 works on road construction, clears homesites, digs basements, and landscapes. The tractor-dozer has plenty of power for these jobs.

Clears snowbound supply lines in winter

Through the long winter months, many families near the city and back in the bush are snowbound. They depend on Geraghty to keep roads to food and supplies open. His snow-clearing jobs range from a quarter mile to a full mile of road. Here's why Geraghty calls the HD-6 the best tractor we've ever owned.

Geraghty's HD-6 starts easily on the job site . . . is ready to work in a few minutes. Sure-fire, dependable direct electric starting right on the job saves from 5 to 10 gallons of fuel per month during the cold stretch.

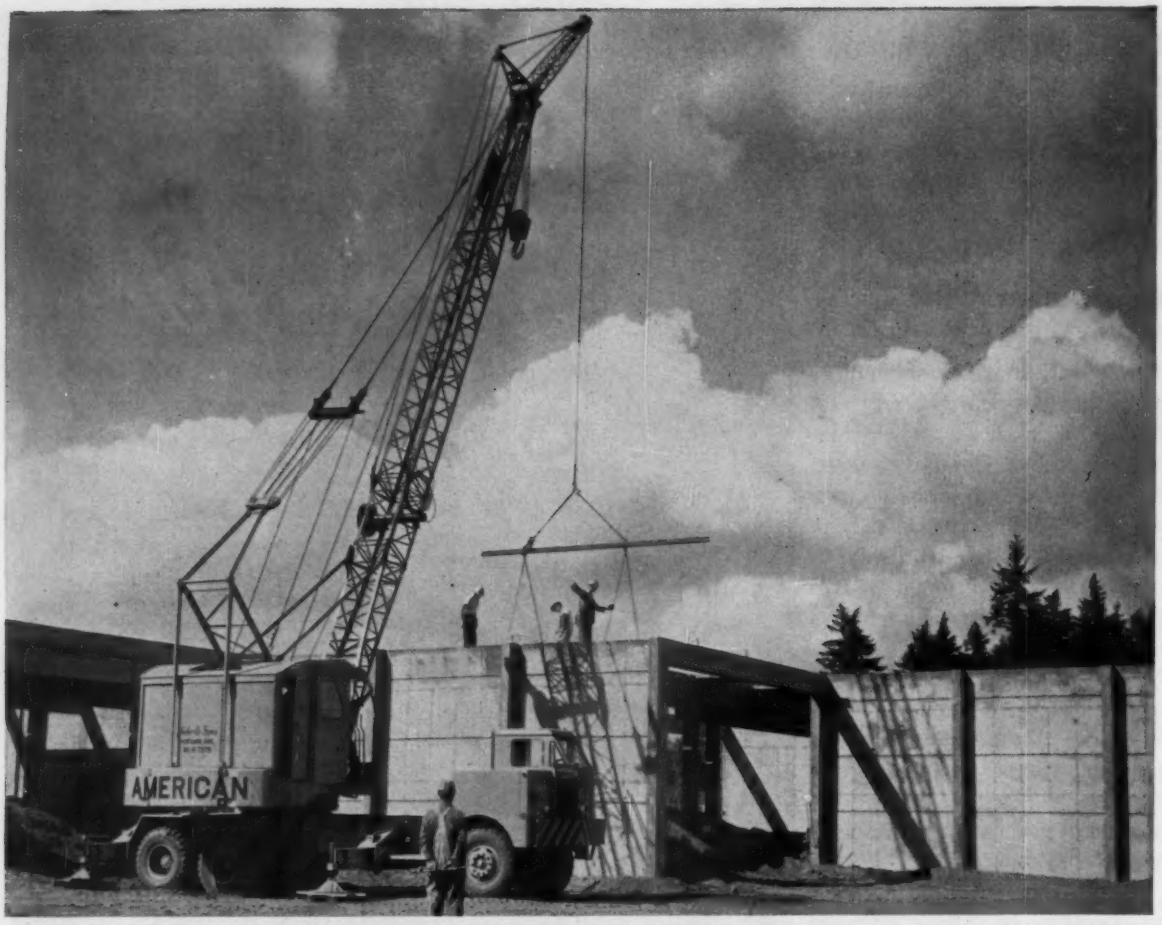
Another reason for the increased production of Allis-Chalmers crawlers is the long lubrication intervals made possible by Allis-Chalmers design. There is no need for Geraghty to fight frozen earth to get at grease fittings—because the truck wheels, idlers and support rollers on his HD-6 need lubrication only once every 1,000 operating hours.

The advantages that Geraghty enjoys on the HD-6 are part of every Allis-Chalmers tractor-dozer. Models for every application range from 66.5 net hp to 225 net hp. Your Allis-Chalmers construction machinery dealer will be glad to demonstrate the machine you need on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

Summer in Alaska finds Geraghty pioneering roads, clearing homesites . . . during winter he uses his Allis-Chalmers tractor-dozer to keep vital supply lines free of snow.

Look ahead... *move ahead* ...and stay ahead with

ALLIS-CHALMERS



INCHING A HEAVY PRECAST roof slab *exactly* into position is simplified with American's power, responsive controls and exceptional balance. Loads to 15 tons—at 22-foot radius—were handled quickly, smoothly on this job.

CRANE "INCHES" PRECAST FRAMES, SLABS INTO PLACE WITHOUT DELAY OR DAMAGE

Handling heavy precast frames and roof slabs is tricky work—calls for a sharp operator and a crane that has power and *precision control* of the load and the boom!

On this school job, Juhr & Sons, building contractor of Portland, Oregon, set heavy precast frames and slabs with their 30-ton American 300 Series Truck Crane. Working with a 55-foot boom and 15-foot jib, the American set loads up to 8 tons at a 35-foot radius . . . 15 tons at 22-foot radius without damaging the units.

Harold Boone of Annand, Boone & Lei, Portland architectural firm, reports this type of construction has resulted in a great saving in costs. He says, "Certainly a large truck crane is most important, and this 30-ton truck crane has performed most satisfactorily on the job."

American 300 Series Cranes are equipped with automatic, over-running sprag clutches to provide continuous boom control that eliminates shock loads. Two-speed transmission slows line speed for accurate control of heavy loads. Many other features—including third drum—are standard equipment!

Juhr & Sons talked to many truck crane owners and operators before buying. They found American owners *highly pleased* with performance and low maintenance. Your American Distributor has detailed specifications on all the important features of American Crawler and Truck Cranes and Excavators that offer capacities starting at ½-yard, 12½ tons!

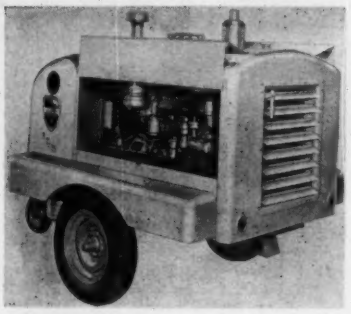
EXCAVATORS-CRANES to 2 yds.-50 tons
LOCOMOTIVE CRANES to 130 tons
DERRICKS-HOISTS to 800 tons
REVOLVER CRANES to 400 tons

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

AMERICAN HOIST PACIFIC COMPANY
Special materials handling equipment

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

Super 55, 77, and 88 tractors. Engineered as companion tools, the Ottawa backhoe and loader operate from one hydraulic system. However, either attachment can be mounted or operated without the other. Outriggers, boom structure, and operation mechanism of the backhoe are supported by a strong A-frame that provides a good foundation for digging and loading at any angle up to 95-deg right or left from the tractor's centerline. Features include a turret-type seat that pivots with the boom; quick on-off connections that make it possible to remove the unit in 5 min; and a patented ejector bucket that automatically forces out all wet, sticky material. The backhoe is controlled by one lever and the loader is operated with only two levers.—**Ottawa Steel Div., Young Spring & Wire Corp., Ottawa, Kans.**

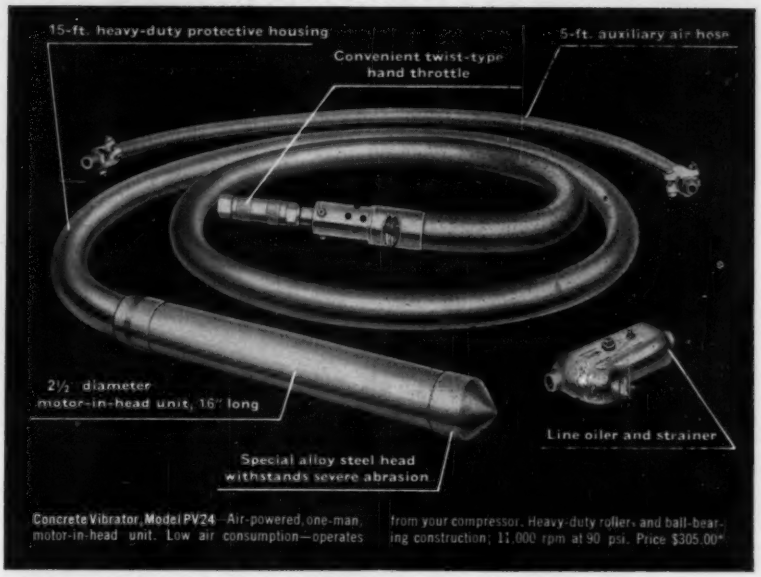


Slow-Speed Compressor

LeRoi's new 125-cfm rotary compressor is one of the lightest (2,250 lb) and the slowest (1,600 rpm) in its class. Called the 125-RG2, the compressor is a sliding-vane, two-stage unit with an in-line cylinder arrangement. It produces 125 cfm of free air compressed to 100 psi. The compressor, which is powered by direct drive from a LeRoi engine, has a 100% modulating control that matches air supply to air demand within a pressure range of 10-psi. One valve controls all air pressure adjustments. The engine and compressor are mounted on a welded frame and enclosed in a lockable steel housing. Three-point suspension enables the rig to be hauled easily over rough terrain. Because the design incorporates a vertical air receiver and a vertical fuel tank, the compressor's cylinders are easily accessible for

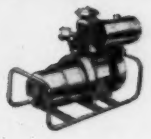
continued on next page

POWER to boost job efficiency with REMINGTON tools

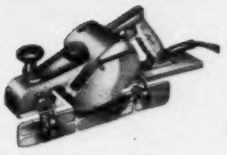

15-ft. heavy-duty protective housing
Convenient twist-type hand throttle
5-ft. auxiliary air hose
2½ diameter motor-in-head unit, 16" long
Special alloy steel head withstands severe abrasion
Line oiler and strainer

Concrete Vibrator, Model PV24—Air-powered, one-man, motor-in-head unit. Low air consumption—operates from your compressor. Heavy-duty roller- and ball-bearing construction; 11,000 rpm at 90 psi. Price $305.00*

Air circular saw, Model P128—12" blade. Husky 2½-hp motor safe from shock hazard around wet piers and wharfs. With case, blade and hose. **Price $345.00***



Generator Set, Model 3WAS—3,000 watts capacity. 25 amp. AC at 115 v.; 60-cycle; four take-off plugs. Reliable Wisconsin 8-hp engine. **Price $525.00***



Planer, Model 3P—Knob depth adjustment can be changed while cutting. Fast, easy to operate; 8.4-amp. 115-v., AC/DC motor; weight: 15 lbs. **Price $170.00***

Remington delivers power, mobility and easy handling to help you cut man hours on the tough jobs. Remington Power Tools are designed and built for long service with minimum maintenance. Your Remington distributor stocks and services the industry's widest selection of power tools and parts.

Sump Pump Attachment, Model 45860—Readily attached to work off Remington flexible shaft vibrators; big capacity, 2" discharge. **Price $90.00***

Electric Drill, Model 540—1¼" capacity; extra-heavy-duty, 18 amp., 115 or 230-v. motor; Timken roller bearings; No. 3 Morse taper spindle. **Price $220.00***

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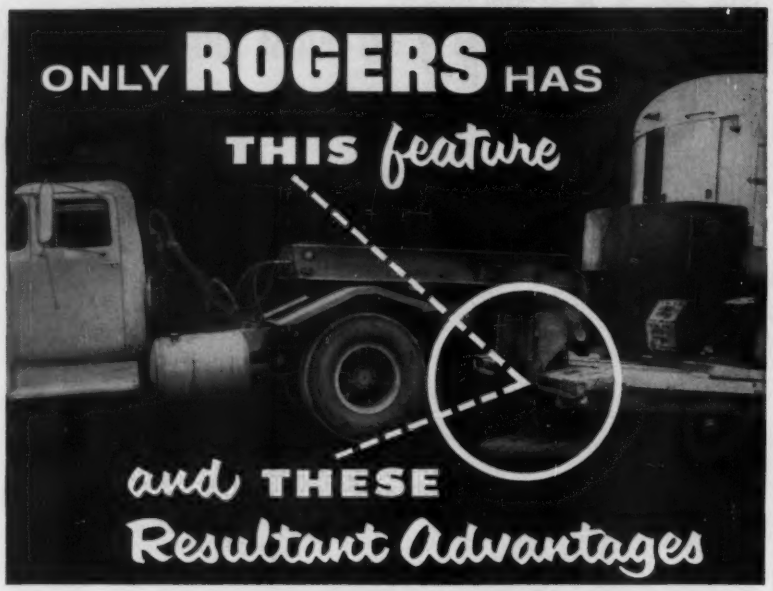

This exclusive feature makes the Rogers HYDRAU-LIFT *more than* a detachable gooseneck trailer — one, in fact, that performs operations no other trailer can handle.

IT *detaches, loads* and *reloads* in as little as 3 minutes.

IT *loads from the front,* making turning on deck unnecessary.

IT can travel *with deck lowered or raised* to pass under or over obstructions thus avoiding detouring, moving ahead and reloading.

IT can *discharge overhanging loads* quickly and simply.

IT *raises tractor or trailer* wheels, while attached, to easily service tires or attach chains.

ITS *flat, unobstructed gooseneck* provides a convenient place on which to carry dippers, bulldozer blades, etc.

IT *requires no winch,* saving up to $900 in cost and 1000 pounds in overall weight.

EXPERIENCE builds 'em

ROGERS HEAVY DUTY Gooseneck Trailers

PERFORMANCE sells 'em

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servicing from the rear galley. Vane inspection can be made by disconnecting the oil pump from the high-pressure cylinder and removing the bearing cap. Other features include rotors that can be turned end to end in the cylinder to prolong life; an oversized, pressurized cooling system with a radiator-type oil cooler located ahead of the engine radiator; and a 12-v electrical system that aids starting in cold weather. The new slow-speed LeRoi compressor is 10 ft 7 in. long, 5 1/3 ft wide, and 5 ft ½ in. high.—**LeRoi Div., Westinghouse Air Brake Co., Milwaukee 1, Wisc.**

Air Works Sludge Pump

A new air-powered sludge pump that can remove up to 42 gal of sediment-filled water a min at a 175-ft head has been developed by Thor. The new pump, called the Thor No. 275, has no motor and its few working parts are stainless steel and self-lubricated. Designed for a continuous two-stage breathing cycle, the pump draws in sediment by air suction until its tank capacity is reached; then it automatically changes the cycle to close the inlet valve, open the outlet valve, and expel the contents under pressure. The compact pump, which can fit in an opening 18x-12½ in., will draw water containing sand, rock cuttings, and other sediment.—**Thor Power Tool Co., 175 N. State St., Aurora, Ill.**

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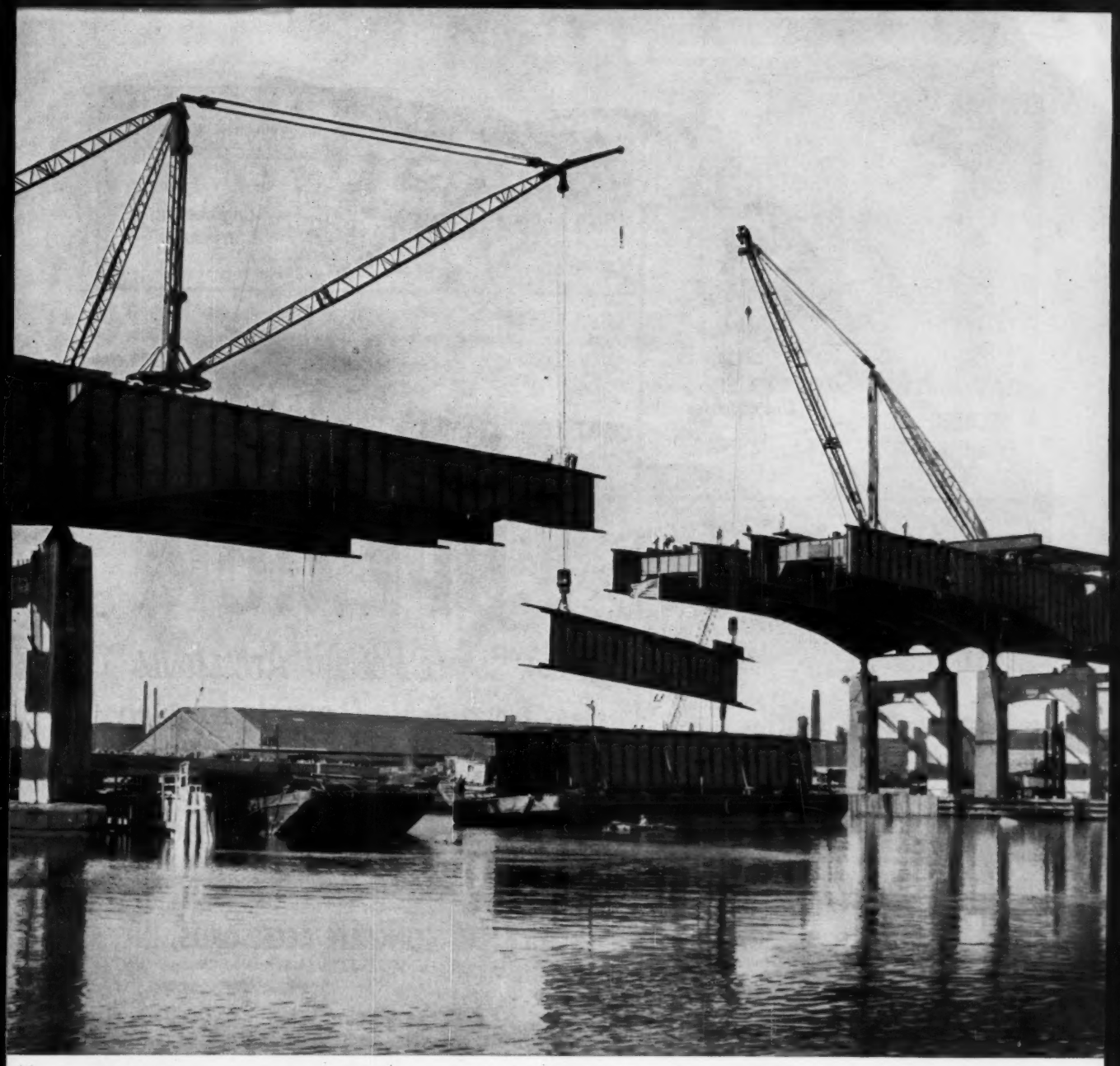
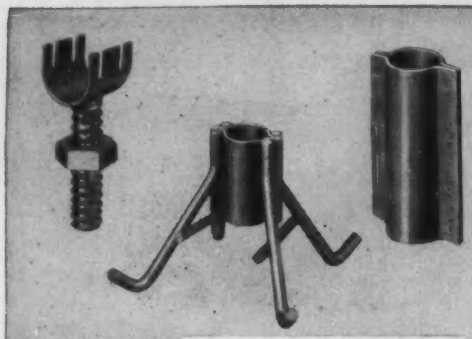


Where Traffic Now Hums Over New Haven's Waterfront. Scenes like this were so familiar during the building of the Connecticut Turnpike. The one shown here is New Haven's waterfront section as the Quinnipiac River Bridge was nearing completion. The bridge's center span, measuring 387 ft, is the longest continuous plate-girder span in the country.

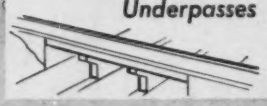
That big girder being hoisted above the channel weighs 89 tons. The span has four such units, side by side, joined at both ends to 140-ft cantilevered arms. Bethlehem wire rope—tough, flexible, and strong—was given the task of lifting these girders and other heavy loads. The ropes on the two big travelers were Purple Strand grade, Bethlehem's improved plow, which is always recommended for jobs of this nature.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
CONSTRUCTION • EXCAVATING • MINING • QUARRYING • PETROLEUM • LOGGING • MANUFACTURING

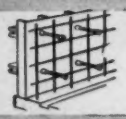


HEAVY-DUTY SCREED SUPPORTS



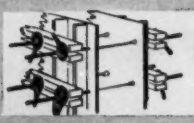
Overpasses and Underpasses

THREADED COIL TIES

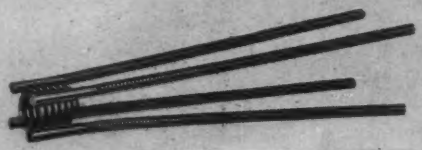


Engineering Structures

TILT LOCK CLAMPS



Heavy-Duty Forming



4-STRUT COIL ROD ANCHORS

Temporary or Permanent Anchorage

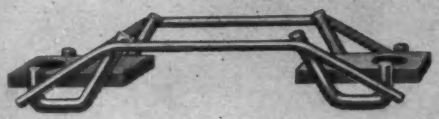


PLATE HANGER FRAMES

Bridge Superstructures

SUPERIOR

One Source For All Accessories For Dependable Concrete Forming

These are examples of the numerous types of form ties, anchors, inserts, and other items in Superior's most complete line of concrete accessories. The illustrations show the variety of concrete form work and related jobs in which Superior accessories are used. All items are designed to provide the most dependable and efficient forming methods.

WHENEVER YOU ARE PLANNING FORM WORK... Superior's technical assistance is available to prepare suggested layouts. Call or write to nearest address shown below.

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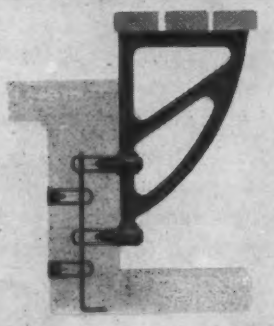
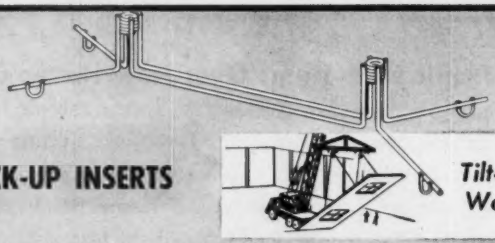


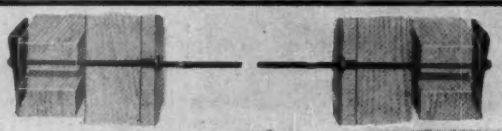
RISER-FRAMES

Stadiums and Grandstands

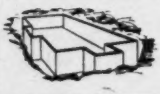


PICK-UP INSERTS

Tilt-Up Work

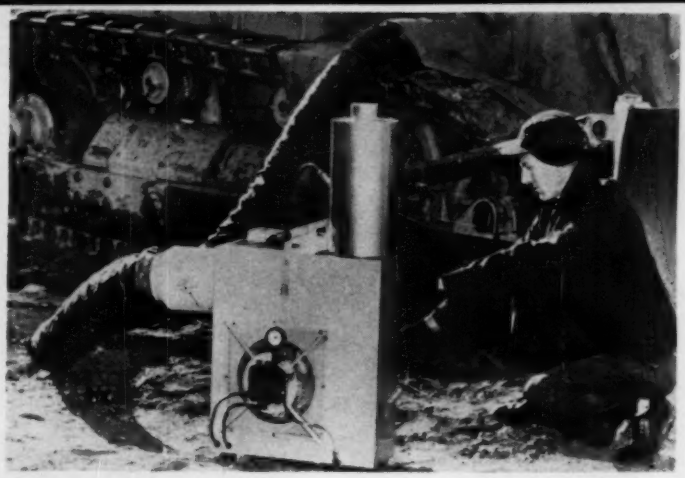


SNAP TIES

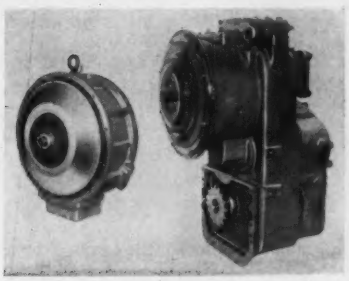


Ordinary Foundations

Thaws Out Frozen Equipment Fast



The MoPeCo model GHE ventilating heater delivers 1,200 cu ft of heated air through 6 or 8-in. flexible ducts to thaw out frozen equipment. A blower directs hot air onto engines and other components. Air from the heater can be fed into sheds, field offices, or tool shacks. Power for the blower is supplied by a Briggs & Stratton engine.—**Morrison-Pelsue Co., 2,256 S. Delaware St., Denver 23, Colo.**



Offers Complete Line

Since its recent acquisition of Westinghouse Electric's hydraulic torque converters and power-shift transmissions, Rockwell-Standard Corp. offers a complete line of drive line components for heavy-duty automotive equipment. This includes driving front axles, non-driving front axles, rear axles, tandem axles, planetary axles, transfer cases, industrial truck axles, and special power transmission units. The Hydra-Drives torque converter (left) now manufactured by Rockwell-Standard combines the advantages of a hydraulic torque converter and a fluid coupling. The unit provides the equivalent of a gear transmission with hundreds of ratios that are selected automatically to utilize the maximum power available. The Hydra-Drives power-shift transmission (right) consists of a torque converter and a power-shift transmission compactly designed in one integral housing. With four speeds forward and reverse, the unit is ideally suited for vehicles that must travel in different directions during a normal work cycle. The unit has a maximum torque multiplication of 3 to 1. — **Transmission and Axle Div., Rockwell-Standard Corp., Detroit 32, Mich.**

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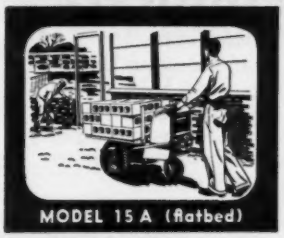

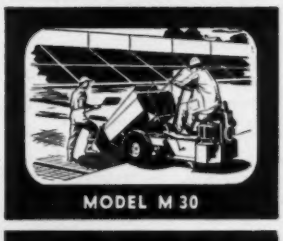

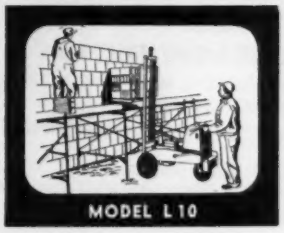

PRIME-MOVERS OPERATE PROFITABLY ON MORE JOBS

than any other powered buggy. Outside or under roof, Model 15A PRIME-MOVERS put your materials where you want them. Little or no preparation required as these units use same runways, ramps or hoists you now have. Triple output of labor with same manpower. Regardless of the stage of your job, you can show immediate profit in placing concrete, brick or tile with PRIME-MOVERS.

PRIME-MOVER

PRIME-MOVER CO., Muscatine, Iowa

Please send job reports, estimating data and literature on PRIME-MOVER equipment for:

CONCRETE PLACING ☐; Model____

BRICK HANDLING ☐; Model____

Name_____

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Load-Rated* DOES THE JOB!

Setting 108" Steel Pipe With Crosby-Laughlin Load-Rated Shackles

Crosby-Laughlin* LOAD RATED Shackles are demanded on jobs where safety is essential! "Takes the guesswork out of buying fittings" say users of the LOAD-RATED Line. Quality steel is drop forged—heat treated for toughness. *Order capacity* for the job—*see* guaranteed capacity stamped on LOAD-RATED Fittings! Safety is no accident when you order from the *world's most complete line* of drop forged fittings for wire rope and chain. Sold by construction, industrial and mill supply distributors. Ask for free catalog.
*Trademark

CROSBY-LAUGHLIN *Division*
AMERICAN HOIST & DERRICK COMPANY
FT. WAYNE, INDIANA

F/S OPTICAL THEODOLITE

Model 4149
with Self-Indexing Unit

A time saving automatic feature ensures sufficient verticality of the main axis and accurate indexing of the vertical circle by simply centering a bull's eye level.

- **Both circles viewed simultaneously**
- **Horizontal scale with optical vernier to 30 seconds. Vertical scale to 1 minute**
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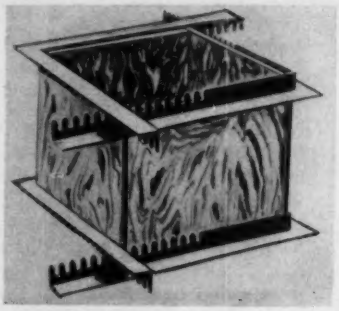
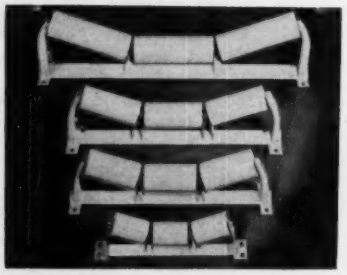


Forms Square Columns

The standard Econ-O-clamp template clamps quickly and easily form square or rectangular concrete columns ranging from 10x10 to 24x24 in. A hammer is the only tool needed to set Econ-O-clamps. There are no accessories or separate parts. One section of the clamp is nailed to the form and the other sections are slipped into place. Notches on the clamps hold each section in place and assure a perfectly square or rectangular form assembly. When not being used, the clamps nest into each other and take up little storage space. The clamps are manufactured from 2x2x⅛-in. steel that is electrically welded into a 90-deg angle. The Econ-O-clamps, which weigh 14 lb per set, are treated to resist rust.—**Deslauriers Column Mould Co., 5,036 W. Lake St., Chicago 44, Ill.**



Adds Conveyor Idlers

Link-Belt now offers belt conveyor idlers in five new series in widths ranging from 14 to 84 in. The new line increases the number of variations now available from Link-Belt from 38 to 64. In all, the line includes more than 630 different types and sizes. The new idlers include flat, 20-deg, (pictured) 45-deg, troughed idlers; rubber-cushioned idlers for use at loading points; actuating-disc training idlers; and variable troughed idlers. All five of the new series feature inverted

"Nothing cuts driver training costs like Torqmatic Drive"

Talk to any hard-boiled construction boss with TORQMATIC DRIVE experience and he'll tell you this modern drive for modern equipment is the real answer to driver-training problems.

The reason is clear—TORQMATIC DRIVES use oil to transmit power. And the oil takes all the beating a new hand usually gives a piece of equipment when he makes a shifting mistake.

So it's practically impossible for a greenhorn to burn out clutches, strip gears, snap drive lines, break axles or lug engines—the kind of equipment damage that can cost as much as $2,000 for every driver trained.

When you add the savings you'll make on TORQMATIC driver training to the extra profits you'll make from greater availability, faster round trips, bigger payloads, better tire life and far lower maintenance costs, you'll quickly see there's nothing like TORQMATIC DRIVE to make contracts more profitable.

You can get TORQMATIC DRIVES in construction equipment to handle every job from first cut to final paving. Find out what's in it for you by looking into TORQMATIC DRIVE before you buy. See your equipment dealer or write:

Allison Division of General Motors, Indianapolis 6, Indiana

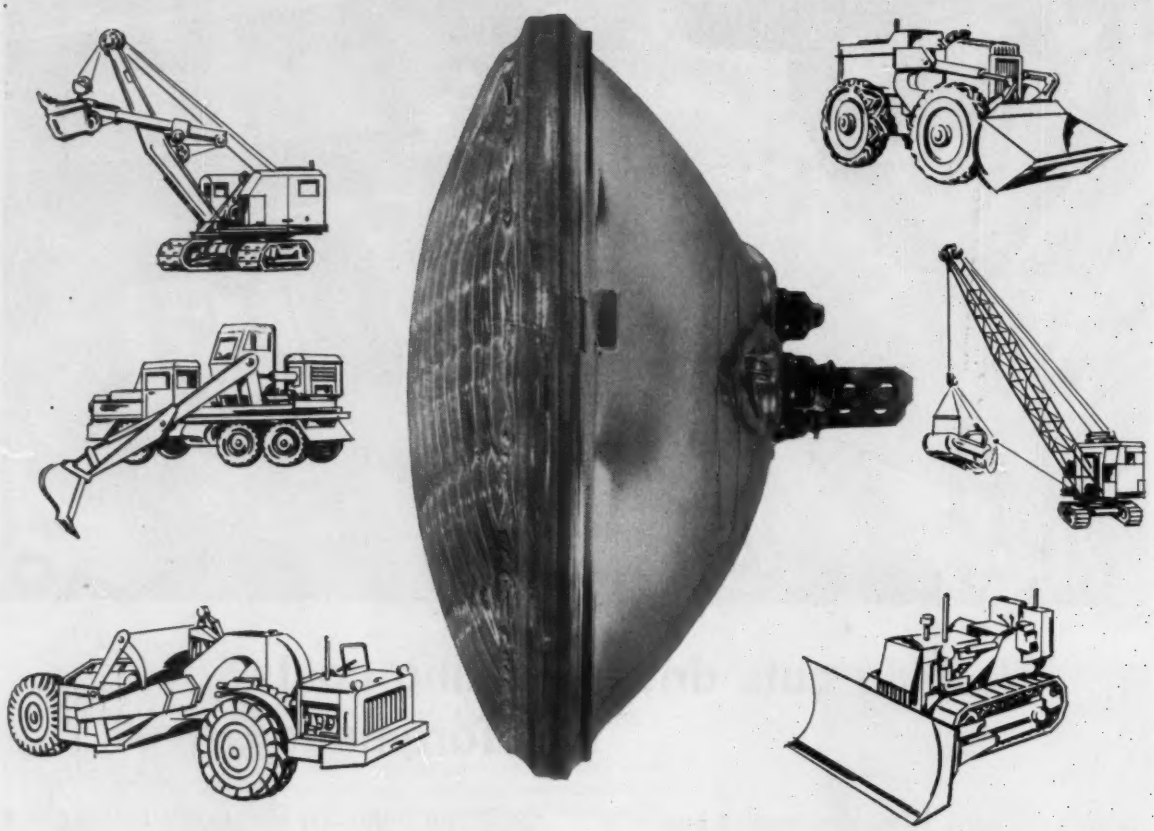
Allison TORQMATIC

TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN EQUIPMENT

New G-E ALL-GLASS headlamps for earth moving equipment

Featuring "far-seeing" flat beam • 6-, 12-, and 24-volt sizes • shielded, for dust and weather



Now! A complete line of *All-Weather* lamps for construction equipment

Specialized lighting for construction, mining and industrial equipment in a full range of sizes and styles is now available for the first time in General Electric's All-Glass C.I.M. line.

Just announced is this powerful headlamp for high speed, off-highway earth moving equipment such as scrapers. High candlepower and a flat, "far-seeing" beam greatly improve operators' night vision—especially in dust—by shielding upward stray light with a built-in shield over the filament.

For slower machines such as bulldozers, shovels and cranes, there are broad-beam floodlamps which cast smooth, even light over a wide working area.

Other units—like graders and rollers—call for combinations of headlamps for forward motion and downward-aimed floodlamps for watching the edge of a fill or for quick turns.

Whatever the job, a General Electric lamp does it best. Dust, dirt and moisture can't get into hermetically sealed All-Glass lamps to scatter and diffuse light. Sealed reflector never needs cleaning. There's no inner bulb to blacken—the whole unit's a bulb! Special hard glass won't crack under heaviest rain or snow splattering. And they're built to take rough treatment day after day.

Your G-E supplier has the full line now. Discuss your special needs with him today or write: General Electric Co., Miniature Lamp Dept. CEM-118, Nela Park, Cleveland 12, Ohio.

SPECIFICATIONS FOR G-E C. I. M. LAMPS

G-E No.	Circuit Volts	Watts	Bulb Dia.	Designed Life
HEADLAMPS				
4080	6	50	5¾"	500 hours
4480	12	60	5¾"	500 hours
4880	24	60	5¾"	500 hours
FLOODLAMPS—PAR 46 bulbs—2 contact lugs				
4078	6	50	5¾"	500 hours
4478	12	60	5¾"	500 hours
4578	24	60	5¾"	500 hours

GENERAL ELECTRIC

angle bases. Idlers have removable steel retainer clips at each bracket to hold rolls in place.—**Link-Belt Co., Prudential Plaza, Chicago 1, Ill.**

Dodge Boosts Ratings

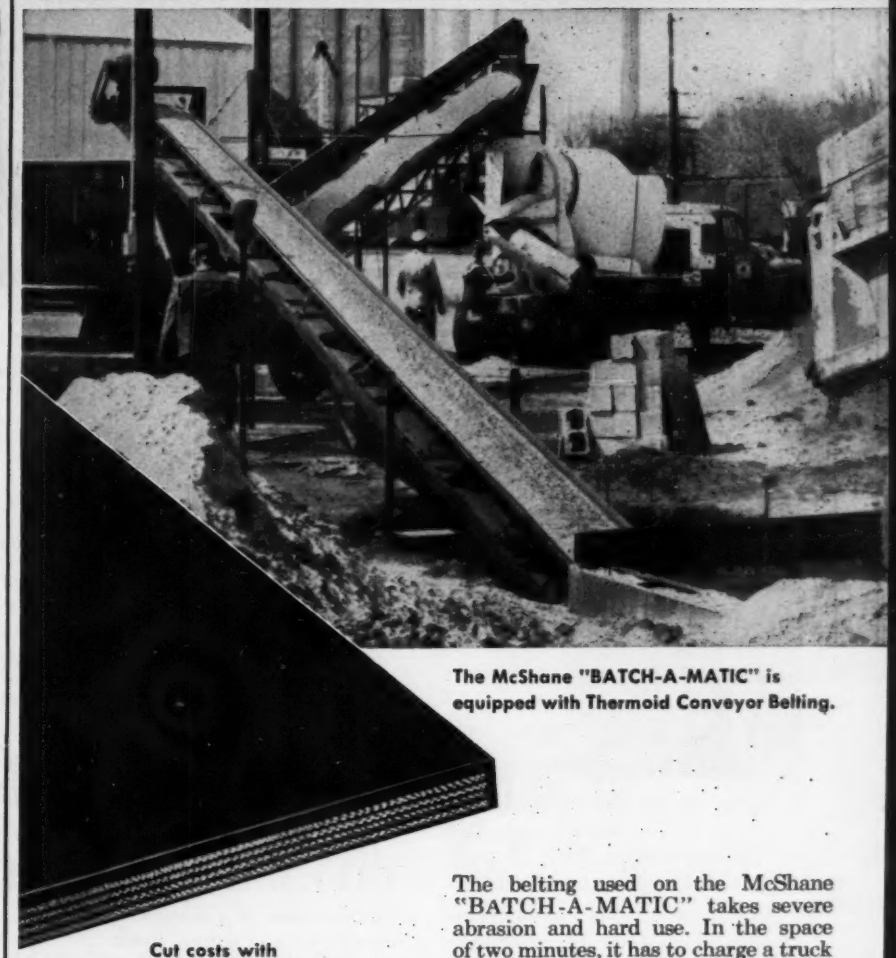
A new series of pickup trucks and an increase in gvw ratings for heavy duty models are features of the 1959 Dodge truck line. The new pickups are said to have the biggest brakes in the industry for vehicles in their class. The new brakes, which provide a total lining area of 192 sq in., provide greater stopping ability with reduced pedal effort. In the heavy-duty field, increased gvw ratings for tandems have been accomplished by increasing the capacities of rear and front axles and brakes. The model D700 dump truck (pictured) has a gvw rating of 25,000 lb. It is powered by a 218-hp, V-8 engine and has a five-speed synchro transmission with power take-off openings on both sides. The new Dodges feature both six and eight-cylinder engines with 11 different horsepower ratings ranging from 113 to 234. Maximum gvw ratings on the new models range from 5,100 to 49,000 lb. Other features include dual headlights, the introduction of two new 318-cu-in. V-8 engines with 8.25-1 compression ratios and redesigned instrument panels. According to the manufacturer, the 1959 line offers the greatest variety of engines, transmissions, and other drive-train components in Dodge history.—**Dodge Truck Div., 2751 E. Jefferson, Detroit 7, Mich.**

Rugged Track Shoe

A new track shoe that actually work-hardens under continued pounding now is available for Caterpillar's D8 and D9 crawler tractors. Designed primarily for work in rock or slag, the new

Thermoid Belting is "built to take it"

at the rate of 175 tons an hour



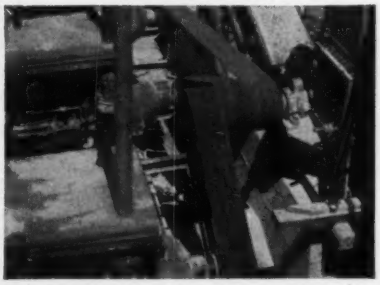
The McShane "BATCH-A-MATIC" is equipped with Thermoid Conveyor Belting.

The belting used on the McShane "BATCH-A-MATIC" takes severe abrasion and hard use. In the space of two minutes, it has to charge a truck with 3 cubic feet of aggregate, *plus* 21 cubic feet of cement . . . or stockpile aggregate at 175 tons an hour.

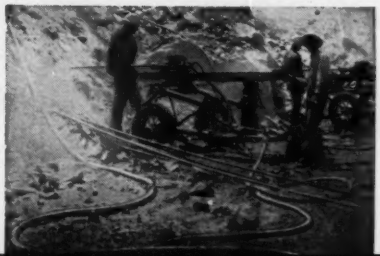
T. S. McShane Co., Omaha, makers of the "BATCH-A-MATIC" equips every machine with Thermoid Belting. To quote Mr. R. Milek, McShane's chief engineer: "Thermoid engineers recommended this belting after studying our needs. This assures every customer long, trouble-free belt life without costly downtime."

Your distributor working with Thermoid engineers can recommend the right belt for *your* needs.

Cut costs with Thermoid Multi-V Belts . . .

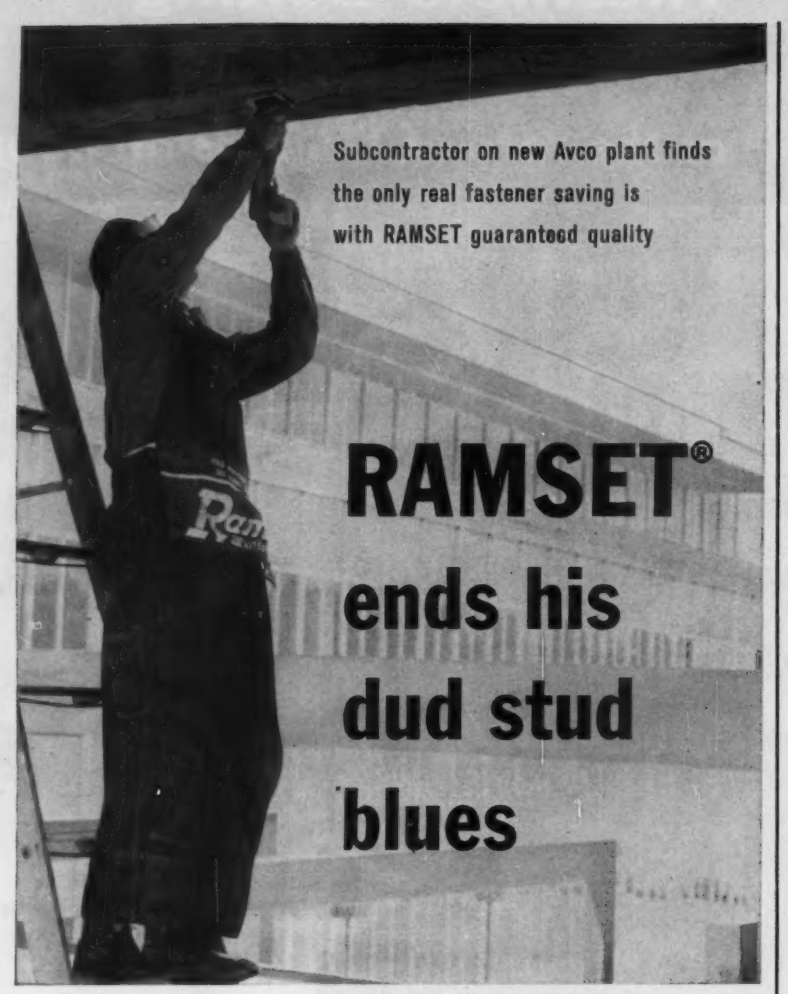


. . . and Thermoid Hose



Thermoid

Thermoid Company
Trenton, New Jersey • Nephi, Utah



RAMSET fastens conduit and fixtures in new $20 million plant of Avco Manufacturing Corp. at Wilmington, Mass. Electrical contractor: Manzi Electrical Corp., Lawrence, Massachusetts.

Ineffective, off-brand fasteners with a high dud rate proved to be an expensive "bargain" for the electrical contractor on this job. He switched to *Austempered* RAMSET studs, and his fastening problems were over.

The general contractor and all subs but one chose RAMSET for the Avco job. All report that RAMSET was fastest, most economical for them.

RAMSET's 100-for-100 guarantee fixes your fastener costs—you pay only for the fasteners called for on the blueprint. If a fastener goes haywire for any reason, it will be quickly replaced . . . free!

For more than 10 years, RAMSET Powder-Actuated Fastening System has proved best for all jobs in concrete or steel. Its unwavering reliability, speed (up to 15 times faster than other methods) and accuracy are the real money savers on any job. RAMSET specialists can solve *your* fastening problems. Call your dealer today—he's listed under "Tools" in the yellow pages.

Ramset Fastening System
WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

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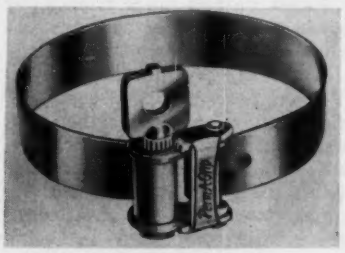
grouser shoes are cast from steel containing 12 to 14% manganese. This alloy steel becomes work-hardened and resists wear much better than a standard track shoe. The manganese grouser shoes are available in 22-in. widths for the D-8 and in 27-in. widths for the D9. They are intended for special applications where track shoes are subject to unusual wear. For grouser applications in sand and earth, the standard steel track shoe is recommended.—**Caterpillar Tractor Co., Peoria, Ill.**

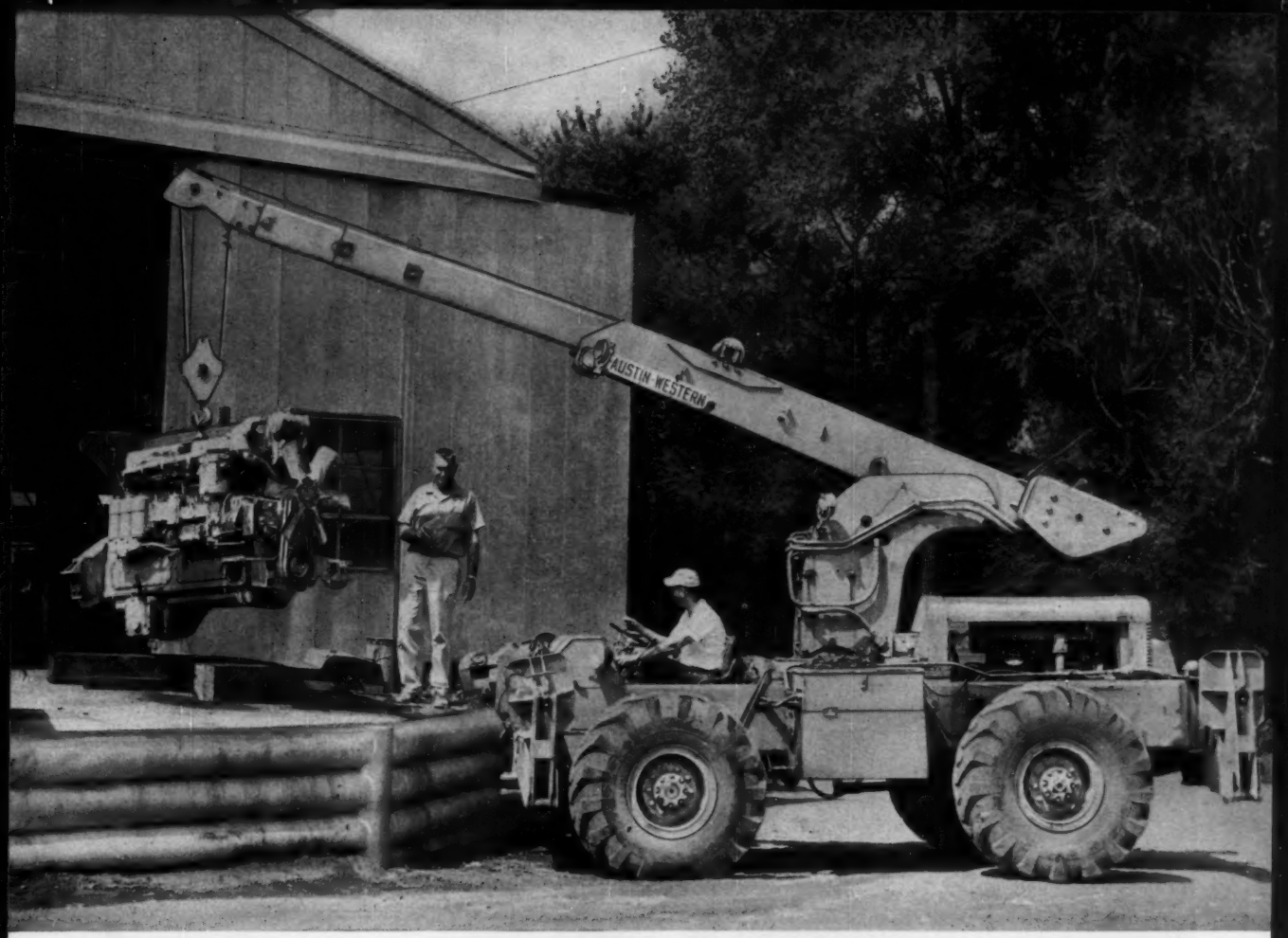
Engine Power Boosted

The newly developed 360-hp model 6-110T engine is the most powerful in Detroit Diesel's line. The new engine is a series 110 model that gains 20% more horsepower through turbocharging. The increase in power is accomplished with no appreciable increase in bulk, weight or fuel consumption, according to the manufacturer. An exhaust-driven turbine driving an air impeller works with the engine blower to increase the fresh air supply to the cylinders. This results in improved combustion and greater efficiency that provides the added power. In addition, the turbocharged engine is not affected by high altitudes. Available with base and radiator or as a fan-to-flywheel unit, the new engine is designed for both mobile and stationary contractor's equipment. —**Detroit Diesel Engine Div., General Motors Corp., Detroit 28, Mich.**



Clamp is Adjustable

The Perm-A-Grip is a reusable steel clamping device that is easily attached to any hose, pipe, or tubing. It employs a pawl-and-ratchet locking principle so that it can be adjusted by tightening a built-in winding device. Only three standard sizes will cover outside diameters from 3.4 to 8 in. When the locking device is



Austin-Western Hydraulic Crane is Ohio contractor's key materials handling unit

C. F. Replogle Co. serves the tri-state area of Ohio, West Virginia and Indiana as engineer and contractor, did close to a $10 million business in 1957. During the 1954 season, the company rented an A-W crane to assist in maintaining its $3¼ million worth of equipment at its five central shops, in Circleville, Ohio. The crane soon proved itself invaluable, and Replogle decided to buy it. In addition to doing the heavy lifting on maintenance jobs, the crane serves the yard detail in handling cables, rollers, oil and other material.

The company tells us: "Everything in the maintenance yard and shops revolves around and depends on the use of this A-W crane. The shop foremen hate to see the crane rented out occasionally, as a favor to neighboring plants, because it requires a bit of planning to avoid interruptions of work, even for the small average of 3 hours a week that it can be spared. In summer it works nearly 16 hours per day. In winter it works about 8 hours per day.

"This unit has unlimited flexibility and turns from handling large crane boom sections in the yard to loading spools of wire on trucks, then to lifting an engine out of a machine. The precise hydraulic control saves time and avoids damage to valuable equipment during repairs."

For the complete C. F. Replogle story, write for Certified Gould Report No. 5705.

Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

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Power graders • Motor sweepers • Road rollers • Hydraulic cranes

BALDWIN BLH LIMA-HAMILTON

NEW SEAL LASTS FIVE TIMES LONGER

New pump shaft seal design mates carbon seat against ceramic-coated bronze ring for extra long service life on toughest pumping jobs. This new seal, standard equipment on the new Homelite "300" pumps, lasts five times longer than ordinary cast iron-bronze seals to slash pump downtime and maintenance costs to a new, negligible low.

USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

Add up all the features of the new Homelite "300" pumps and you'll find your best and surest pump answer to saving money on the job.

More Capacity. These new 3" pumps handle 18,000 gallons per hour. That's 300 gallons per minute. You can do your pumping in minutes . . . eliminate labor-costing delays. You can pump muddy or sandy water easily without clogging.

Light Weight. With dimensions of 25" x 19" x 23", the Homelite "300" pumps weigh only 103 pounds. They're easy to truck, easily picked up and carried by one man, fast to get on the job in any location.

Higher Head. Homelite "300" pumps are guaranteed to self prime at 28 feet above water level. Total head, including friction, is 65 feet. Standard-speed model gives you a total head of 125 feet. High-pressure model gives you total head of 185 feet.

Variable Speed. Hand throttle control allows you to pace these pumps to the job. You can throttle them down for quiet, economical handling of seepage.

Longer Life. Homelite pumps are famous for fast starting and trouble-free operation in any kind of weather. The design and workmanship that goes into a Homelite air-cooled gasoline engine driven pump is your guarantee of long life for the pump. Now with the new seal, standard equipment with the "300" pumps, you're even surer of long life and low maintenance cost.

It will pay you to ask for a free on-your-job demonstration of the new Homelite "300" pumps right away. Three models available: slow-speed; standard-speed and high pressure.

Homelite factory branches are located throughout the country. Your nearest one is as close as your phone. Call them or write for convincing demonstration or rapid service in any way.

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HOMELITE • A DIVISION OF TEXTRON INC.
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tightened, the clamping band is reeled in, leaving no excess band exposed.—**Dixon Valve & Coupling Co., 152 Columbia Ave., Philadelphia 22, Penn.**

1959 Ford Truck Line

Seven new tilt-cab tandems and several four-wheel-drive units feature Ford's 1959 truck line, which includes 371 models ranging from luxury pickups to heavy-duty models in the 50,000-lb gvw class. Ford's new four-wheel-drive models, in the F-100 and F-250 series, can pull easily through deep mud or sand. Some models can climb grades up to 60%. The new tilt-cab tandems (pictured) combine serviceability advantages with powerful tandem axles and rugged chassis. Major service operations, such as replacing an engine, can be done in almost half the time required for other cab-forward models, according to Ford. Eight rear wheels on these tilt-cab tandems provide excellent flotation characteristics. Ford's V-8 engines for the heavy duty truck line are rated at 226 hp, 401-cu-in. displacement; 260 hp, 477-cu-in. displacement; and 277 hp, 534-cu-in. displacement. Operation of the V-8's has been improved over last year by adding a new series of carburetors, new tappets of heat-treated iron, new exhaust manifold gaskets, new air cleaner elements, new fuel pump filters, new oil pan baffles for better lubrication, and modified combustion chambers that increase fuel economy. Redesigned cabs incorporate wrap-around windshields, improved ventilation systems, better seats, and double-grip door locks. Other features include new internal-expanding two-shoe parking brakes that offer 50% more holding power; and new frame reinforcements on some models that add about 40% more strength.—**Ford Div., Ford Motor Co., Rotunda Drive at Southfield Rd., P. O. Box 608 Dearborn, Mich.**

storage...

is this your wire rope problem?

Avoid deterioration while equipment is idle. Red-Strand Bulletin No. 103 tells how.

Costly damage can be the penalty for improper outdoor storage of wire rope especially in winter. Several months of exposure can corrode rope so severely that breaking-strength is dangerously reduced with a loss much greater than the cost of adequate protection. How best to provide that protection is clearly explained in special Service Bulletin No. 103. This is one of a series, devised to help wire rope users get better performance without greater cost. Copies of bulletins are sent free on request. Write H. K. Porter Company, Inc.—Leschen Wire Rope Division, St. Louis 12, Mo.

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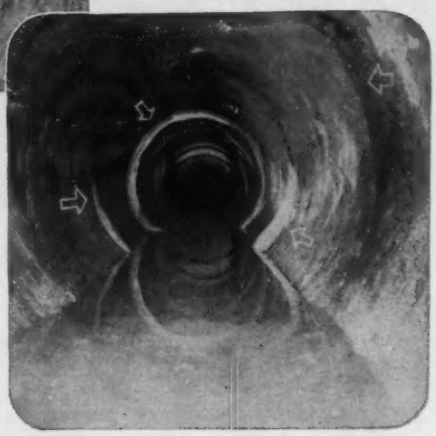

AFTER

Here is what Underwater Services, Valley Station, Ky. had to say about Waterplug

On October 6, 1957, our Underwater Services Company was called upon to repair a major break in an underwater drainage system for the Hardin County Sportsmen's Lake at Elizabethtown, Kentucky. Upon diving to the bottom of the lake we discovered several large ruptures in the 24" tiles used in the drainage system. Water, uncontrolled, was pouring through these breaks at a minimum approximate rate of 20 gallons per minute. Using underwater diving equipment we managed to reduce this torrent by packing sandbags into the holes channeled through the four feet of earth covering these tiles. Descending through a water control tower, we gained access to the interior of the drainage tiles to the area of break-through. Above us were four feet of lake bottom and 20 feet of water above that. Under these extremely adverse conditions we used the Thoro System WATERPLUG Cement to repair the breaks from the interior of the tiles.

Because of the simplicity and ease of mixing and applying WATERPLUG Cement, we were able to completely and effectively repair these breaks in the drainage system.

We were delighted with the effectiveness of WATERPLUG Cement in successfully overcoming this difficult water repair problem. Feel confident that in future underwater repair problems, our company will rely upon WATERPLUG Cement.

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New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

TRUCK CRANE—An 8-p catalog describes the new Lima type 64-T, 50-ton capacity truck crane. The catalog highlights the design and operating features of the four axle truck crane. These features include "pin-on" type front and rear outrigger boxes, hydraulic power steering, compact heavy-duty rotating assembly, independent planetary boom hoist, main machinery, folding gantry and pin connected boom.—**Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio.**

TRANSMISSIONS—A 10-p booklet, Form 114, describes the complete line of single-stick, semi-automatic Fuller RoadRanger Transmissions. Included is data on the R-35, R-46, R-63, R-630-D, R-96, and R-960 RoadRangers for off-highway service. Described are complete shifting patterns, gear ratios and the percent of step between ratios for all standard and optional ratios. Condensed specifications for weight, size, approximate engine size, mounting, clutch housings and oil capacity are shown for each model.—**Fuller Manufacturing Company, Kalamazoo, Mich.**

STEEL PRODUCTS—A new bulletin announcing worldwide export service of specialized steel products is available from Foster International Corporation, an affiliate of L. B. Foster Co. It illustrates many of the company's products, including new and relaying railroad rails, track accessories, steel sheet piling, steel pipe piling, tested and structural pipe from ⅛-in. to 48 in. valves and fittings, heavy machinery, and a variety of highway construction materials.—**Foster International Corp., 11 Park Place, New York 7, N. Y.**

WELDING SUPPLIES — Form ADC 848C, a new 52-p catalog covers Airco's complete line of fluxes and ferrous and non-ferrous rods for gas welding, acces-

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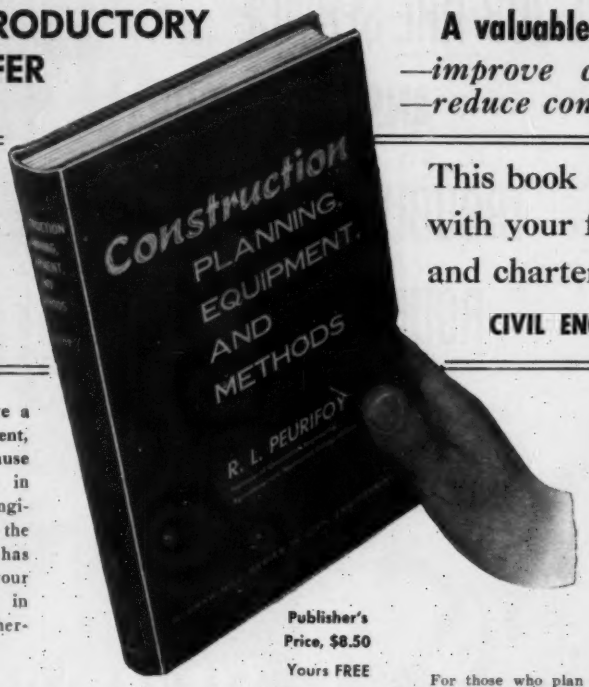

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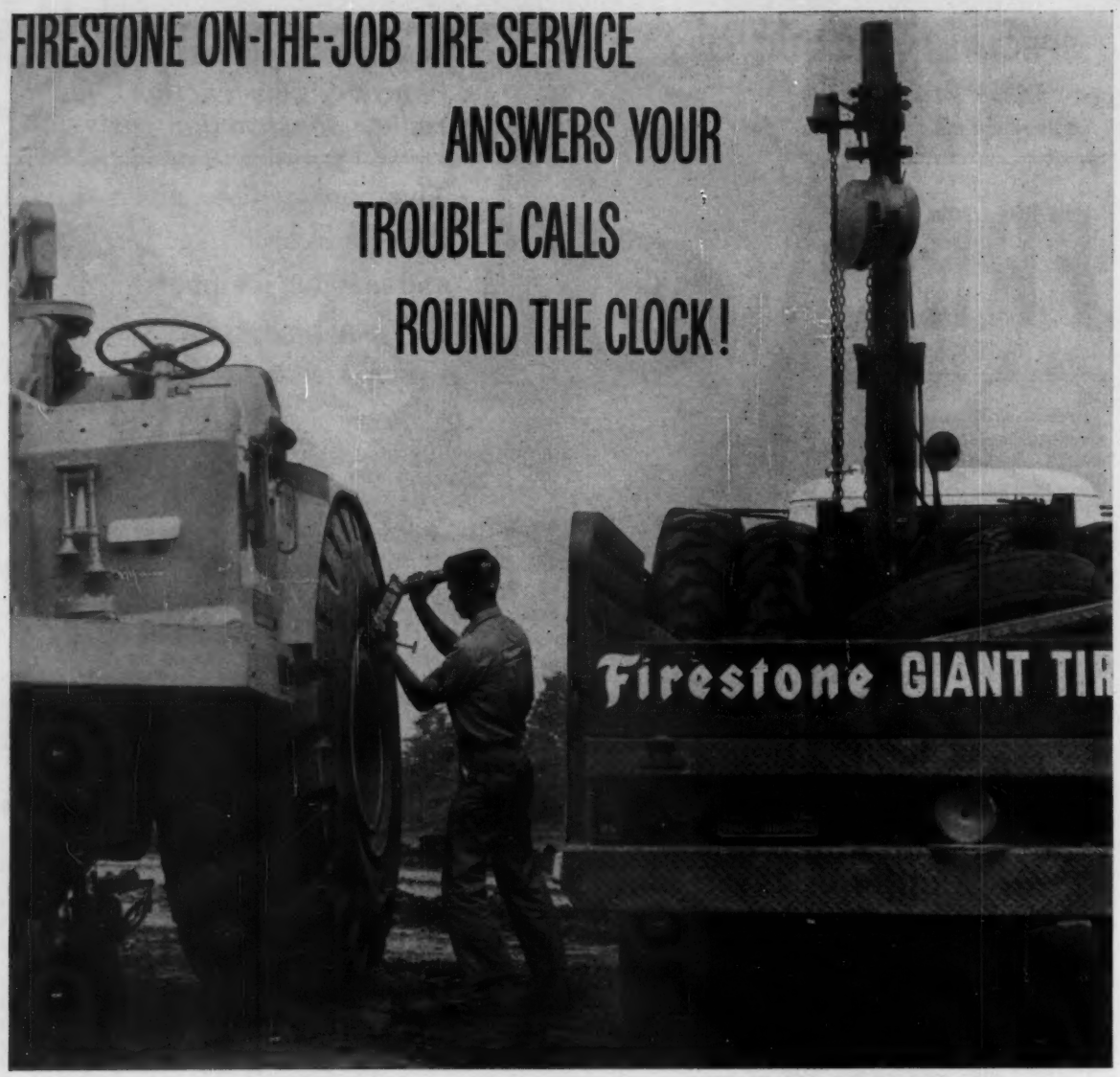

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Firestone service trucks are on the job 24 hours a day to beat your downtime due to tires. Completely equipped trucks are ready to service construction tires on the spot. Trained servicemen have the know-how and the tools to handle the largest tubeless or tubed off-the-highway tires. Besides emergency tire service, a Firestone Tire Expert inspects tires regularly—checks for proper inflation. Count on Firestone to turn downtime delays into worktime profits! Contact your Firestone Dealer or Store about Firestone's Giant Tire Service. Combine Firestone's Giant Tire Service with Firestone off-the-highway tires to hold down tire costs. Remember—there's a Firestone tubeless or tubed tire for every piece of equipment on construction projects.

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NEW PUBLICATIONS . . .
continued

sory items including protective clothing, goggles, electrode holders, sparklighters, cable, hose, weld cleaning tools, cylinder trucks, and many other items for both arc and gas welding.—**Air Reduction Sales Company, 150 East 42nd St., New York 17, N. Y.**

BLACKTOP EQUIPMENT—Littleford Bros., Inc., has issued two new bulletins. Bulletin JJ-5 describes the Model 101 Utility spray tank used for repairing rural roads, patching city street, spraying driveways and parking lots, and for fogging the surface in front of a paver. Bulletin JJ-38 describes the Model E Spray Chief bituminous distributor. Designed with the small contractor in mind, the Spray Chief works best on driveways, parking lots, and secondary roads.—**Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, Ohio.**

COMPACTION EQUIPMENT—A 12-p bulletin, No. S-74-858, gives a description and condensed specifications for every Buffalo-Springfield roller and piece of compaction equipment. Included are the new KT-7A and KT-8 portable tandem rollers, standard 2 and 3-axle tandem rollers, and the K-45 Kompactor.—**Buffalo-Springfield Company, Springfield, Ohio.**

NEW PAINT—A new paint for the protection of galvanized surfaces regardless of their condition is described in Red Lead Technical Letter No. 13, entitled "L.I.A. Formula 9-2, A Single Red Lead Primer for Rusted, Weathered or New Galvanized Steel." — **Lead Industries Association, 60 East 42nd St., New York 17, N. Y.**

WATERTIGHT MASONRY — A 6-p bulletin, O.M.—8A, discusses the important elements involved in the design and specification of watertight masonry. The booklet discusses selection and proportioning of ingredients, types of mortar, compatibility of brick and mortar, importance of shrinkage control, the effect of mortar bleeding, mechanical disturbances, and the role played by Omicron Mortarproofing. — **The Master Builders Company, 7016 Euclid Ave., Cleveland 3, Ohio.**

continued on next page

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continued

CASTINGS — A 166-p catalog covers the line of construction castings produced by the Neenah Foundry Co. Included are manhole covers, bridge and building drains, curb and bumper guards, street drains, drainage structures and grates, and building drains.—**Neenah Foundry Co., Neenah, Wis.**

ALLIS-CHALMERS BOOKLETS —Four new equipment folders are available. Form BU-485 describes the engineering, design, and construction of the recently introduced FT20-24, 2,000-lb capacity lift truck. Form BU-412 describes the G-226 portable, lightweight generator set. Form UT-103 is a pictorial review of the D-Series utility tractor line including various attachments. Form UT-105 is an additional booklet on the D-series, showing various applications for the D-14 and D-17 tractors.—**Allis-Chalmers Mfg. Co., Tractor Group, Box 512, Milwaukee 1, Wis.**

CASE BOOKLETS — J. I. Case Company has issued a number of data sheets on trenching, loading, and dozing machines. A 6-p leaflet shows the company's line of wheel and crawler tractors, companion backhoes, front-end loaders and dozer blades. Six 2-p specification sheets spotlight major operating features and mechanical details of individual tractor-equipment combinations. A seventh 2-pager describes a 5-ton tilt trailer. Catalog No. CTS-112 describes hydraulic power-tilting and power angling dozers which are not available on Case TerraTrac 42 hp, Model 320 crawlers.—**J. I. Case Co., Industrial Division, Racine, Wis.**

CONVEYOR BELT — A 12-p booklet, No. M302, describes a new Ray-Man conveyor belt.—**Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.**

JAW CRUSHERS—A 16-p catalog describes 13 crusher sizes in the Rogers heavy duty line and 7 sizes in the Rogers roadbuilder series. Two pages feature panorama views of Rogers crushers at work in plants located in the U. S. and many foreign countries. —**Rogers Iron Works Company, Joplin, Mo.**

Bethlehem Hollow bites into hard basalt at site of powerhouse for Ice Harbor Dam, being built on Snake River, Washington, by U. S. Army Corps of Engineers, Walla Walla District. *Contractor:* Montag-Halvorson-Austin & Associates. Drill steel furnished and reconditioned by Senter Tool Service.

Boring into basalt at Ice Harbor

Ice Harbor Dam, currently under construction, is the first of four dams planned for the Lower Snake River, in southeast Washington. Ultimately, this water-control system will extend slackwater navigation from the confluence of the Snake and Columbia Rivers, a distance of 150 miles, to Lewiston, Idaho. Ice Harbor Dam will be 2,790 ft long, and will control a 35-mile reservoir.

The project called for the removal of 780,000 cu yd of basalt, and the drilling phase was accomplished economically with Bethlehem Hollow Drill Steel. Blast holes ranged from 12 ft to 24 ft deep.

Bethlehem Hollow Drill Steel is ideal drill steel for economical rock drilling. It's tough, fatigue-resistant, long-lasting. Its uniformly round hole is centered in the bar. It has a wide quenching range. Moreover, it is easy to heat-treat to attain the proper balance of toughness and wear-resistance, making possible strong threads and shanks.

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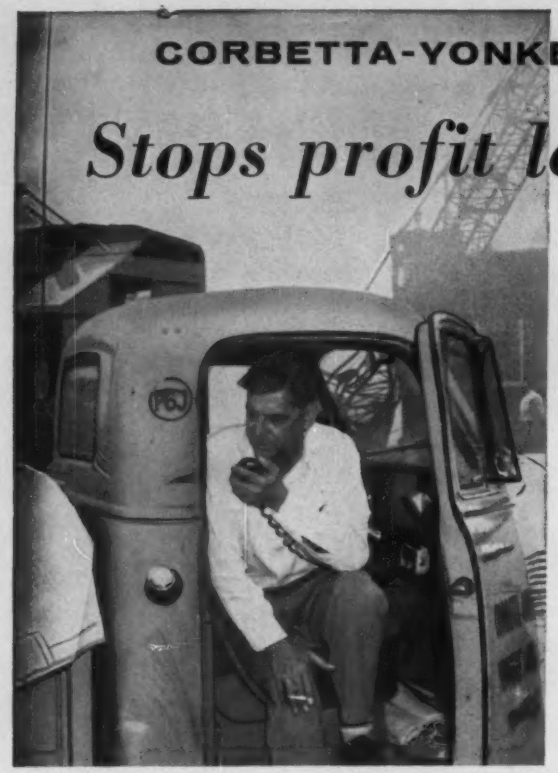

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It Costs Money to have a Bulldozer Idle! These mechanics arrived minutes after the breakdown because they were called by radio.

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With about 450 men on the job, using approximately 250 pieces of major equipment to build 8 bridges and miles of retaining walls, as well as the main highway, there are many opportunities to save money with radio.

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160 Calls per Day reports the base station dispatcher.

Or, if lack of a compressor is holding up an important job, it takes just a few minutes to contact everyone using compressors and find out who can spare one. There may be a question about the location of a utility line. Are the utilities superintendent's drawings up to date? There's no danger of a major mistake when he can pick up his microphone and call field headquarters for the answer.

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Just a few of the ways in which Corbetta Yonkers cuts costs, increases profits with Motorola 2-way radio. Learn how you, too, can increase profits on your next job. Write, phone or wire: Motorola Communications & Electronics, Inc., Construction Department.

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Fuel Injection Systems Determine Power Output

LIKE MUSICAL INSTRUMENTS, internal combustion engines must be finely tuned to produce best results.

When an engine fails to develop its rated power and there are no obvious mechanical failures the chances are that the fuel injection system is not functioning properly, according to the Euclid Division of General Motors Corp. This important component performs three big jobs: it determines the air-fuel ratio by metering the correct amount of fuel; it delivers fuel to the cylinders at the right time; and it makes sure that fuel is in the proper condition to burn properly.

Unless the injection system is tuned to perform these three jobs the engine wastes fuel, needs more maintenance, and — most important — fails to develop its rated power.

The power output of an engine is determined by the torque it develops, the speed at which it turns, and its mechanical limitations. Engine design is a fixed factor, but the speed and torque an engine produces depend on how well it is tuned.

If fuel injectors are not timed properly, fuel enters cylinders either too early or too late. In either case, horsepower drops and fuel is wasted. Fuel delivered too early burns in the cylinder before the piston has completed its compression stroke. This builds up pressure against the piston as it moves up the cylinder and it neutralizes some of the power developed by the stroke. It also affects the other cylinders and reduces total power output.

When an injector is timed too late, it begins injecting fuel after the piston has completed part of its power stroke. Some fuel may be partially or totally unburned when the exhaust valves or ports open. When this happens, partly burned fuel goes out the exhaust stack as smoke and unburned fuel washes over the cylinder walls to the crankcase.

In addition to reducing power and wasting fuel, faulty injection timing increases engine maintenance, Euclid warns. It also shortens engine life. Early injector timing increases shock loads on pistons, connecting rods, and crankshafts. Late timing reduces combustion temperatures in the cylinders and increases the wear rate of vital parts. It also causes carbon to build up in the upper cylinder area, and it fouls injectors, valves, and piston rings.

Even though injectors are adjusted to deliver the right amount of fuel at the right time, the fuel must be in the right condition when it is injected into the cylinders or maximum power cannot be obtained.

Maximum power requires maximum fuel combustion. Fuel burns completely only when it is thoroughly mixed with air in the cylinders at a predetermined rate. If fuel is dumped into the cylinders in a batch or as a solid stream it does not burn properly. Because this has the same effect on an engine as improper timing, check injectors frequently to see that their spray tip holes are not plugged, partly blocked, or eroded. If any of these conditions exists, the injectors cannot atomize fuel into the fine spray that is needed to burn it completely.

Speed Determines Output

The amount of fuel burned in the cylinders determines engine speed as well as torque output. An engine slows down when load is increased unless more fuel is injected into the cylinders. If the load on the engine is decreased, the engine will speed up until less fuel is injected.

Thus, by varying the volume of fuel, engine speed is regulated and horsepower output is controlled. Accurate speed control, therefore, is essential if the engine is to deliver its rated power.

On most diesel engines, speed is determined manually by the operator. Generally, the engine also is controlled by a governor that maintains minimum and maximum speed limits to prevent the engine from stalling or overspeeding.

SPEED TELLS—Mechanic checks diesel engine speed with gage. Unless engine runs at rated speed it can't develop full power.

Because maximum power is developed only at rated engine speed, the governor must be adjusted frequently so that the engine can run at the rated speed. It is not uncommon for a big diesel to lose 10 hp for every drop of 100 rpm in engine speed. Unless the governor is set correctly, engine efficiency drops drastically.

Make sure that you follow the engine manufacturer's recommendations when adjusting the fuel injection system. No other engine component differs in design as much as do the injection systems on the various makes of diesel engines. Because of this, all engine manufacturers have gone to great pains to make their service manuals for injection systems as clear as possible. Remember, no two systems are alike.

When the manufacturer's recommendations are followed, proper engine tuning is a relatively simple job that takes little time, and its value will show up quickly on operating cost sheets and production charts.

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Boston 16: 350 Park Square Bldg.

Methods Memo . . .

Test Paving

Traffic now rolls where these machines of S. J. Groves & Sons Co. worked last summer. It's the AASHO Road Test near Ottawa, Ill., a $22-million research project that will have an important influence on future highway design and construction.

A flare exploding in the air started 60 trucks rolling over the five test loops on Oct. 15. The trucks will run about 18 hours a day, six days a week for two years. Drivers are men of the U. S. Army's Transportation Corps.

The AASHO Road Test contains 836 separate test sections representing nearly 200 different combinations of base, subbase, and paving. Half of each test loop is paved with portland cement concrete and half with asphaltic concrete.

Construction of the project was a precision job all the way (CM&E, May p. 96, June, p. 90). Probably specifications were tighter and controls more strict than ever before on a highway job. Tolerance on the subbase, for example, was ⅛ in.

Engineers and technicians of the Highway Research Board will administer and direct the two-year test. They are equipped with more than $1 million of electronic and mechanical instruments to record data on the behavior of the pavements under traffic.

Tokyo's Tower

The Japanese now claim the highest structure of its type in the world.

It's a steel tower, similar to the Eiffel Tower in Paris, that rises to a total height of 1,092 ft. That includes an 82-ft TV antenna. The Eiffel Tower is only 984 ft high. The Empire State Building in New York City is 1,472 ft to the top of its TV antenna.

The tower in Tokyo is 262 ft square at its base. It is designed to take winds of up to 210 mph, and it is earthquake resistant. It will have a five-story TV studio at the base, a restaurant at the 400-ft level, and an observation platform near the top.

Carpenters Seek Good Publicity

The carpenter's union has hired a top-level public relations firm to counteract the bad publicity it has received as a result of hearings before the McClellan committee of the Senate.

The firm is Communications Counselors, Inc., of New York, an affiliate of the McCann-Erickson advertising agency. An official of the firm said it was preparing a program on a broad scale to "convey the true picture of the economic and social contributions" of the carpenters to the nation.

Maurice Hutcheson, president of the carpenters, is under indictment on charges that he conspired with others to bribe an Indiana state official in a scandal over right-of-way acquisition for the Indiana Toll Highway.

He also faces a contempt of Congress charge voted unanimously by the Senate last August after he refused to answer questions about alleged misuse of union funds before the McClellan committee.

Hutcheson was scheduled to appear before the executive council of the AFL-CIO this month to answer charges of corruption in his union. But this may be postponed until the next quarterly meeting of the council in February because of the quadrennial convention of the carpenters this month in St. Louis.

Educating Equipment Men

A course of college training for construction equipment salesmen will begin next year at Clarkson College of Technology in Potsdam, N. Y.

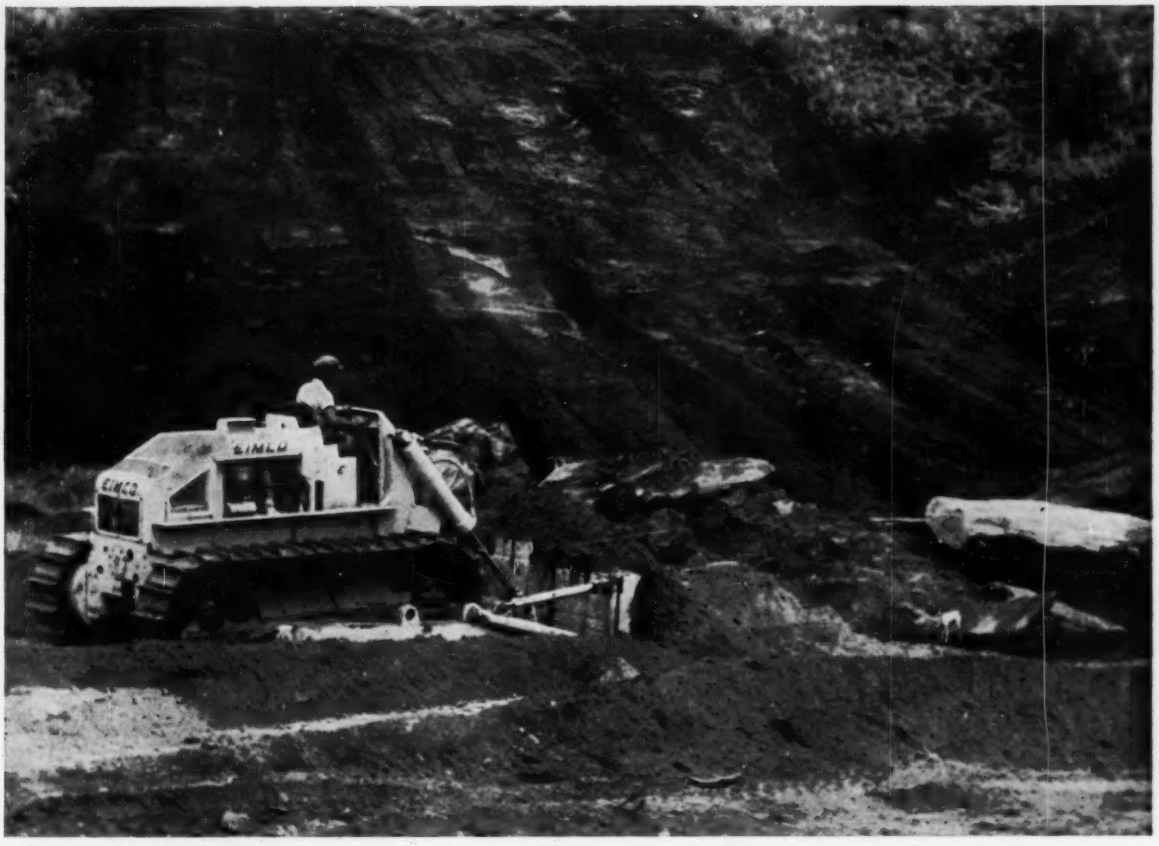
It will lead to a bachelor of science degree in "Construction Equipment Distribution." The college will offer courses on construction equipment, soils engineering, transportation and public service facilities, construction organization, and civil engineering. Students will have frequent meetings with leaders of the construction equipment industry.

The course has the support and financial backing of Associated Equipment Distributors, national organization of construction machinery distributors. AED's president, H. D. Anderson of Rish Equipment Co. in Bluefield, W. Va., called the new course "a vital answer to our problem."

"Construction is now the largest industry in the nation," he said. "It's an industry that is expanding at a rate much faster than we can train personnel to meet the challenge.

"The firms that supply the shovels, cranes, tractors, scrapers, graders, earthmovers, and other machines used in construction are faced with a serious shortage of trained personnel.

"We feel that the establishment of the construction equipment distribution curriculum at Clarkson is a vital answer to our problem. A student who completes this program will be particularly well fitted to apply his engineering and business knowledge to the marketing of construction equipment."



TOMORROWS BULLDOZER–TODAY!

"THE BULLDOZER OF THE FUTURE" this is the way one Road Dept. official described the Eimco 105 when he saw it operate on competitive tractor tests. Here, once again, the Eimco 105 Dozer has demonstrated superiority over conventional type tractors. In job after job, the 105 consistently proves that its simplicity of operation, smooth power flow, visibility, maneuverability and reduction in operator fatigue is the difference between marginal production and profitable production.

The work site consisted of a steep incline with rock outcropping in big slabs. The bottom ends of the rocks were deeply embedded and required maximum tractor effort to remove them.

Bulldozing down the slopes, the torque converter drive of the 105 enabled it to pick up a capacity load and move down the slope ahead of the competitive tractors with their outmoded conventional type drives.

Throughout the test — straight bulldozing, removing rocks and maneuvering — the 105 managed everything that came its way and did it with the least amount of operator effort. In direct contrast, the competitive tractor operators were constantly clutching, changing gears and braking to accomplish their tasks.

Eimco's Unidrive constant mesh transmission gives variable speed independent track control without clutching and shifting. Let us demonstrate this tractor.

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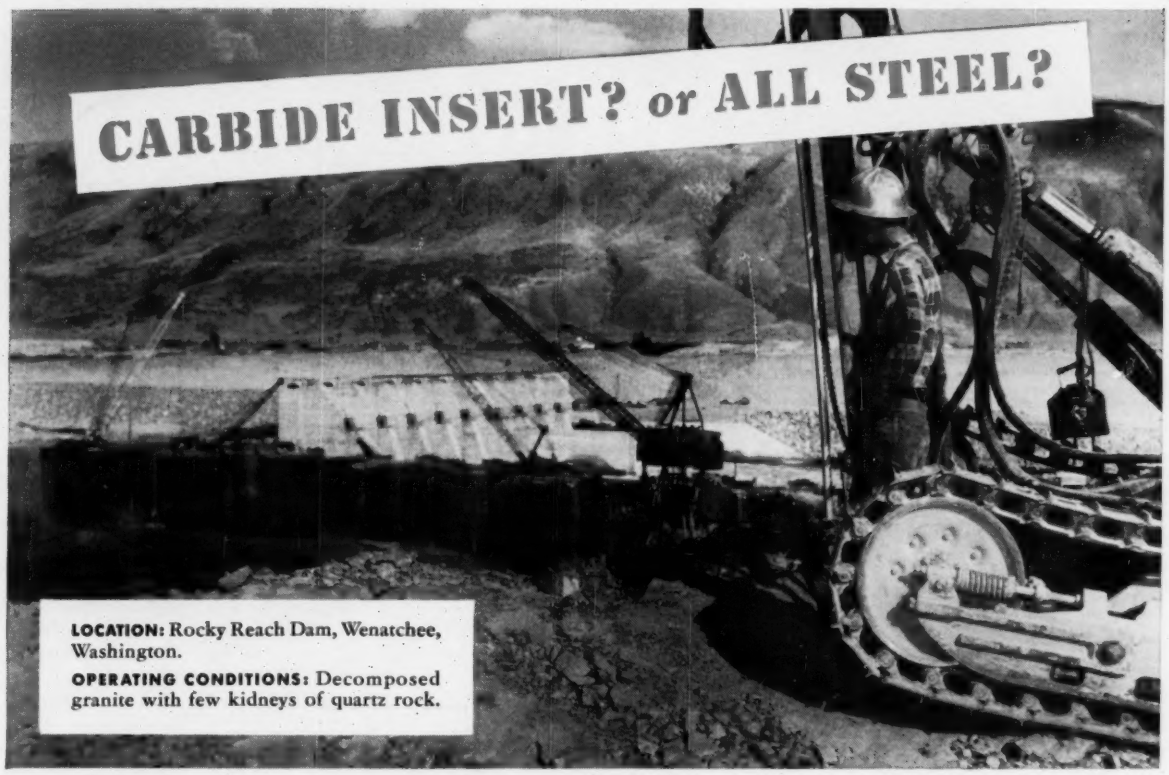
CARBIDE INSERT? or ALL STEEL?
LOCATION: Rocky Reach Dam, Wenatchee, Washington.
OPERATING CONDITIONS: Decomposed granite with few kidneys of quartz rock.

"We drill 1400 to 2000 feet of blast hole per bit with TIMKEN® carbide insert bits"

... Reports Goodfellow Brothers, Inc.

DRILLING to relocate the Great Northern Railroad and Highway near Wenatchee, Washington, Goodfellow Brothers, Inc. selected Timken® carbide insert bits to drill blast holes in the decomposed granite and kidneys of quartz rock. Regrinding both gauge and flutes, they got 1400 to 2000 feet of blast hole from every bit.

That's the kind of performance you get with Timken carbide insert bits when conditions call for them. Their five front holes and deeper wing clearance help clear chips faster. You drill rock instead of chips.

But carbide insert bits may not always be your best bet. In ordinary ground, you'll save more with Timken all-steel bits. With correct and controlled reconditioning, they give you lowest bit cost per foot of hole when you can drill out full increments of steel.

But whatever your drilling conditions and whatever type of bit you use, your drillers will save time and you'll save money with Timken bits. They're all interchangeable in the same thread series. Your drillers can change bits as fast as the ground changes—without changing drill steels.

All Timken bits are made of Timken electric furnace fine alloy steel. We're the only American maker of removable rock bits who takes that extra step. And you get extra protection from a special shoulder union that protects threads from drilling impacts.

Get the right and most economical bit for your drilling jobs. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO".

Timken threaded all steel multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN *your best bet for the best bit for every job*

TRADE-MARK REG. U. S. PAT. OFF.